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ADVANCED INTEGRATED DISPLAY SYSTEM
V/STOL PROGRAM PERFORMANCE SPECIFICATION

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This document specifies the program performance requirements for the data processing component of an Advanced Integrated Display System.

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SECTION 1

INTRODUCTION

1.1 PURPOSE

This document specifies the program performance requirements for the data processor software component of an Advanced Integrated Display System (AIDS). The AIDS described herein supports the Airborne Early Warning (AEW) and Anti-submarine Warfare (ASW) missions of the proposed V/STOL Type A aircraft. This Program Performance Specification (PPS) is intended as part of the requirements specification which will be used by the Navy to procure V/STOL Type A prototypes.

This specification is prepared in accordance with the instructions in "Tactical Digital Systems Documentation Standards" (SECNAV 74). Section 1 briefly describes AIDS. Section 2 of a PPS normally lists the applicable documents. In this PPS, references are listed in a bibliography; Section 2 contains only a reference to the bibliography. Section 3 defines the functional and performance requirements of the AIDS software. Section 4 describes the techniques to be used to ensure the quality of the AIDS software. Appendix A contains a glossary of AIDS acronyms. Appendix B contains a specification of the crew control inputs.

1.2 MISSION

The AEW and ASW missions for the V/STOL Type A aircraft are described in the "Request for Quotation for Development of V/STOL Type A Weapon System" (NAVAIR 77). Briefly, the AEW aircraft is responsible for monitoring the tactical environment, sharing tactical intelligence with other platforms, and vectoring intercepters to targets. The ASW aircraft is responsible for locating and destroying hostile submarines.

1.3 SCOPE

1.3.1 Identification

The AIDS processing is distributed among AIDS data processors and the AIDS microprocessors. The terms "software" and "firmware" are used in this specification to distinguish between programs which run in the data processor (software) and programs which run in the microprocessor (firmware). This document specifies only the AIDS software. This software comprises the Operational Display Software (ODS), the Data Processor ICS Software (DPICS), the Graphic Real-Time Application Display Support Software (GRADS), the AIDS Operating System (AOS), and the Standard Executive (SDEX/M) for the AN/AYK-14.

1.3.2 Functional Summary

AIDS controls and processes all the information flow between the aircraft crew and the aircraft systems. This information includes both aircraft flight information and mission information. AIDS provides four modes of information

exchange. To the crew, information is provided in a visual mode through displays and in an audio mode through voice synthesis; from the crew, information is accepted in a tactile mode through control panels and in an audio mode through voice recognition. To provide this information flow reliably and in real-time, the AIDS software performs the following functions:

o Initialization of the avionics systems with the specific mission and flight plan data.

o Input of flight control and mission data from the "External Avionics Subsystems." These subsystems comprise all the avionics subsystems in the aircraft except AIDS.

o Conversion of input data into appropriate dynamic display formats and synthesized voice messages.

o Acceptance of both tactile and voice commands from the crew and routing each command to the appropriate destination, either inside or outside of AIDS.

o Reconfiguration of AIDS in response to both mission mode changes and hardware failures.

The AIDS software is partitioned into a set of information processing and display subsystems and a set of common support procedures. The information subsystems are the flight data display subsystem, the equipment monitoring subsystems, the communication data display subsystem, the AEW display subsystem, and the ASW display subsystem. The collection of all these information display subsystems is known as the Operational Display Software (ODS).

Examples of the support procedures are the kernel operating system, the display support procedures, the tactile command input procedures, and the system initialization procedures. The collection of all the support procedures is known as the Operational Support Software (OSS). Within the OSS, the kernel operating system is the Standard Executive (SDEX/M) for the AN/AYK-14; the AIDS-specific operating system is the AIDS Operating System (AOS); the display support procedures are the Graphic Real-Time Application Display Support (GRADS) run-time procedures, and the tactile command input procedures are the Data Processor Integrated Control Set (DPICS) software.

This document is the highest-level specification of the AIDS software. The detailed requirements for each of the above AIDS software components are not described herein. For example, the details of the format symbology appearance and placement and of the crew commands are not described. The detailed functional requirements will be included in Program Performance Specifications for the ODS, OSS, DPICS, and GRADS.

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SECTION 2

APPLICABLE DOCUMENTS

2.1 APPLICABLE DOCUMENTS

The applicable documents are listed in the bibliography.

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SECTION 3

TACTICAL DIGITAL SYSTEM REQUIREMENTS

3.1 INTRODUCTION

This section describes in detail the AIDS software functional requirements. Section 3.2 describes the AIDS architecture and lists the AIDS peripherals and interfacing programs. Section 3.3 contains the functional description. Sections 3.3.1 through 3.3.3 describe the hardware and the hardware interfaces. Section 3.3.4 describes the software interfaces. Section 3.3.5 introduces and briefly describes the 19 functions which constitute the AIDS software. Sections 3.4.1 through 3.4.19 describe in detail the requirements of each function. Section 3.5 lists the adaptation parameters of the AIDS software; these parameters include the throughput and memory requirements of the software.

3.2 SYSTEM DESCRIPTION

This subsection describes the tactical system in which the AIDS software executes. Section 3.2.1 briefly describes the hardware system, Section 3.2.2 lists all the AIDS peripherals, and Section 3.2.3 lists all the programs with which the AIDS software interfaces.

3.2.1 General Description

The AEW and ASW V/STOL Type A aircraft avionics are distributed among several subsystems, one of which is AIDS. The other subsystems are the Joint Tactical Information Distribution System (JTIDS), Communication System (COMM), Navigation subsystem (NAV), the Universal Locator-Airborne Integrated Data System (ULAIDS), the Solid-State Electrical System (SOSTEL), the Integrated Engine Instrumentation System (IEIS), the ASW system, and the AEW system. These subsystems communicate with each other using a redundant digital bus which conforms to MIL-STD-1553. AIDS is responsible for interfacing these systems with the crew.

The AIDS software specified in this specification, as well as the other V/STOL avionics, will exist in two versions, one supporting the AEW mission and one supporting the ASW mission. A large portion of these avionics will be common to both versions. This portion is known as the core avionics. In general, the core avionics support the pilot, whereas the noncore avionics support the particular mission.

AIDS is modular in terms of both hardware and software. A common set of AIDS modules will be used to construct both the AEW and ASW versions. In terms of the AIDS software, the AEW and the ASW display subsystems shall encapsulate the differences between the two versions. The other AIDS software modules shall be common to both versions. This same partitioning applies to the AIDS hardware, described below.

AIDS provides six displays for the pilot: Head-Up Display (HUD), Helmet Mounted Display (HMD), Vertical Situation Display (VSD), Horizontal Situation Display (HSD), Left Status Advisory Display (LSAD), and Right Status Advisory Display (RSAD). The HUD, HMD, and VSD present flight data; the HSD displays

tactical data superimposed on a moving map display; the two SADs present engine, communication, and aircraft status information. The HUD, HMD, VSD, and HSD are also capable of displaying sensor-generated video (e.g., Low-Light-Level TV (LLLTV) and Forward-Looking Infrared (FLIR)).

For the ASW mission, AIDS provides three displays for each of the two mission officers; the Sensor Officer (SENSO) and the Tactical Officer (TACCO). The displays are a Tactical Display (TD), an Auxiliary Display Unit (ADU), and a Status Advisory Display (SAD). The TD presents geographically oriented sensor and target positions, the ADU displays acoustic information, and the SAD augments both the TD and ADU with alphanumeric annotation.

For the AEW mission, AIDS provides two displays for each of the three missions officers, a TD and an SAD. The AEW officers are the Combat Information Control Officer (CICO) and two Air Control Officers (ACO1 and ACO2). The TD displays the geographically oriented tactical environment and the SAD provides alphanumeric annotation of the TD symbology.

In both versions, the pilot station and each mission officer station include an Integrated Control Panel (ICP). The ICP contains both fixed and variable function switches as well as a force stick. The force stick provides each crewmember with an analog input device. In addition to an ICP, the pilot is provided with a Mode Control Panel (MCP). The MCP contains fixed switches with which the pilot specifies the current mission mode. The ICPs and the MCP support the tactile crew input mode. A signal voice recognition system provides a voice input mode. The allocation of this system to a single crewmember is a function of mission mode.

The fourth communication mode, voice output, is provided by a single voice synthesis system. Voice synthesis is used to alert the crew to warning and caution situations and to output system parameters during information-intensive mission segments. For example, altitude and rate of descent are periodically output fed during landing.

In addition to the tactile and voice input modes, which are used during the mission, AIDS provides a mission data input device used during system initialization. This device is the Briefing Information Entry Device (BIED). The BIED is a cassette tape reader into which the pilot inserts a cassette tape on which the specific mission description has been recorded.

AIDS is a distributed system, with processing distributed among AIDS data processors and AIDS microprocessors. Currently, the AIDS data processor is the AN/AYK-14 (GE791, CDC77) and the AIDS microprocessor is the Texas Instruments SBP 9900 (GE79n, TI 76). It is anticipated that over the multiyear V/STOL development period, new processors may replace the AN/AYK-14 and the SBP 9900. Consequently, in this specification the terms "data processor" and "microprocessor" are used instead of the actual computer names. Only when computer-dependent processing is described are the names "AN/AYK-14" and "SBP 9900" used.

Each AIDS hardware component exists either as a separate physical unit in the cockpit or as a component in the AIDS Modular Integrated Display Electronics Rack (MIDER). The displays, ICS, BIED, voice recognition, and voice synthesis

modules are cockpit units; the remainder of the hardware resides in a MIDER. The ASW system requires three MIDERs; the AEW system requires two MIDERs. Each MIDER contains one data processor. The other components of a MIDER are listed below in Section 3.2.2.1.

All the AIDS hardware components are interconnected using buses. AIDS uses three low-bandwidth (~1 MHz) digital buses and one high-bandwidth (15 MHz) video bus. The digital bus which interconnects MIDER components is known as the MIDER bus (Mbus). The digital bus connecting the AIDS cockpit hardware and the MIDERs is known as the internal bus (Ibus). The digital bus connecting AIDS to external avionics subsystems is known as the external bus (Xbus). The video bus connecting external video sources and the displays to the MIDERs is known as the video bus (Vbus).

Figures 3-1 and 3-2 illustrate the hardware and interconnections of the AIDS for ASW and AEW, respectively. To complete the description of the environment in which the AIDS software operates, the AIDS support must be mentioned.

AIDS requires a substantial set of program generation support software. This software includes the AIDS Display Formatter, the AIDS Command Formatter, and the AIDS Equipment Formatter. These formatters execute in the program generation system off-line to AIDS operational software execution. The formatters translate descriptions of displays, ICS interactions and aircraft equipment into tables which are included in the operational software.

3.2.2 Peripheral Equipment Identification

The AIDS peripheral equipment may be divided into four categories: the peripheral equipment connected to the Mbus, the peripheral equipment connected to Ibus, the peripheral equipment connected to the Xbus, and the peripheral equipment connected to the Vbus. The peripheral equipment is listed below according to these categories. Detailed descriptions of the equipment and the AIDS interfaces are contained in Sections 3.3.1 through 3.3.3.

3.2.2.1 MIDER Bus Peripheral Equipment

Ibus Controllers

Xbus Remote Terminal

Mass Memory System

Raster Symbol Generators

Scan Converters

Signal Processors

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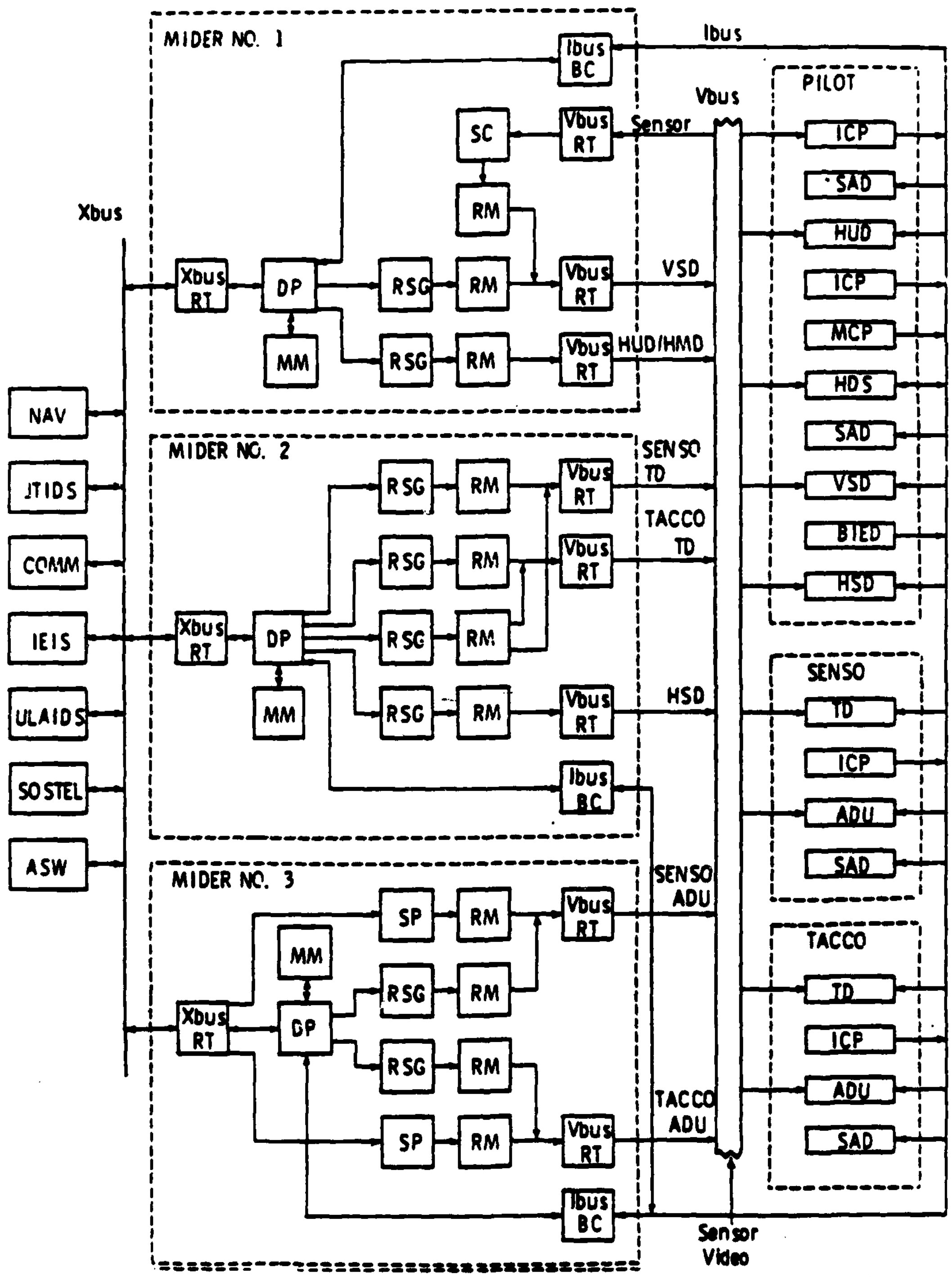

RSG	Raster Symbol Generator	Xbus RT	Xbus Terminal
DP	Data Processor	Ibus BC	Ibus Controllers
MM	Mass Memory	Vbus RT	Vbus Remote Terminal
RM	Refresh Memory	SP	Signal Processor
SC	Scan Converter		

FIGURE 3-1 - AIDS ASW system configuration

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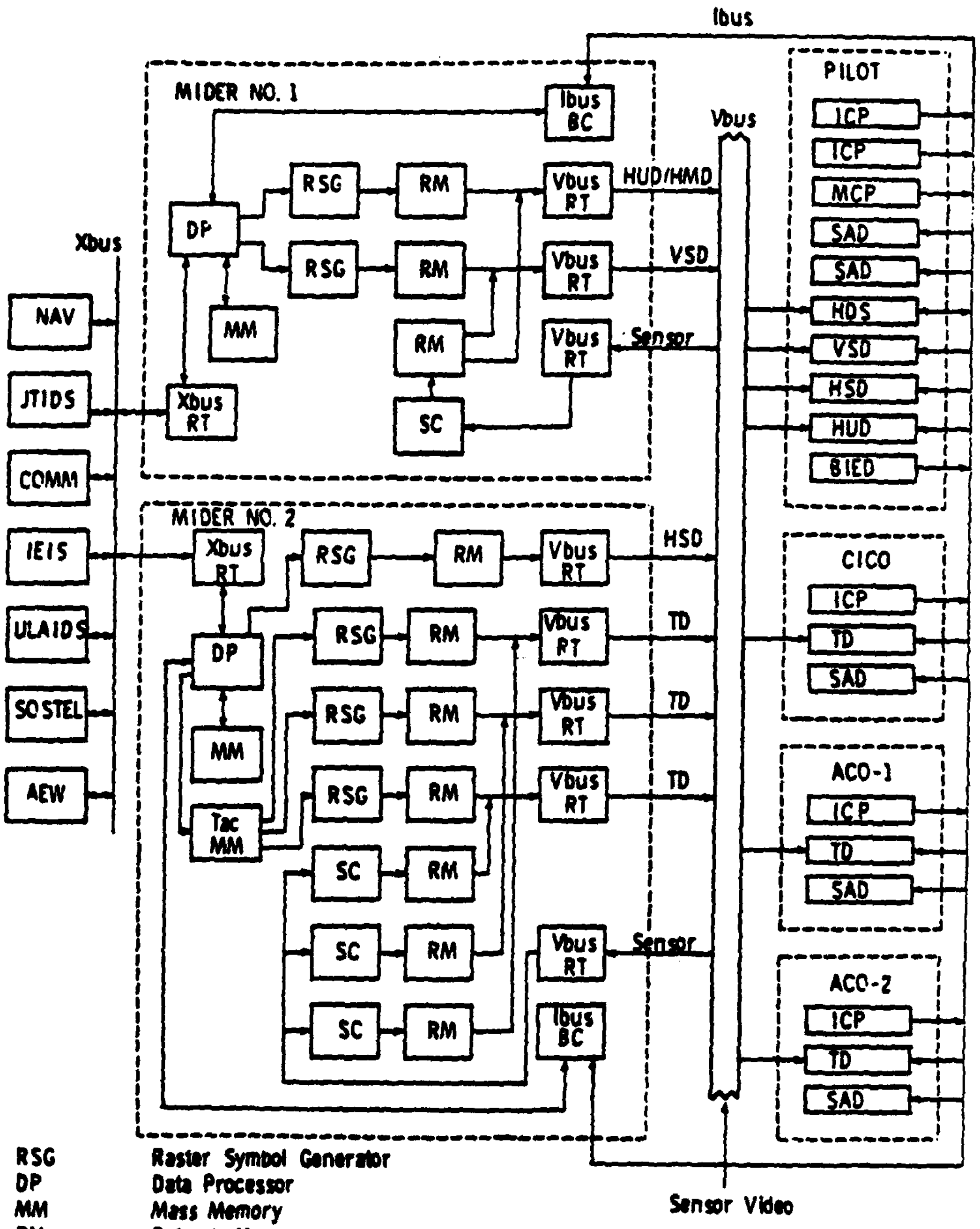

RSG	Raster Symbol Generator
DP	Data Processor
MM	Mass Memory
RM	Refresh Memory
SC	Scan Converter
Xbus RT	Xbus Terminal
Ibus BC	Ibus Controllers
Vbus RT	Vbus Remote Terminal
Tac MM	Tactical Mass Memory

FIGURE 3-2 - AIDS AEW system

3.2.2.2 Internal Bus Peripheral Equipment

Head-Up Display (HUD)

Multifunction Displays (MFD)

Helmet Mounted Display (HMD)

Status Advisory Displays (SAD)

Tactical Displays (TD)

Auxiliary Display Units (ADU)

Integrated Control Panels (ICP)

Mode Control Panel (MCP)

Briefing Information Entry Device (BIED)

Voice Recognition System

Voice Synthesis System

Modular Integrated Display Electronic Racks (MIDER)

3.2.2.3 External Bus Avionics

Navigation System (NAV)

Joint Tactical Information Distribution System (JTIDS)

Communications System (COMM)

Universal Locator-Airborne Integrated Data System (ULAIDS)

Solid-State Electrical System (SOSTEL)

Integrated Engine Information System (IEIS)

AEW System

ASW System

3.2.2.4 Video Bus Peripheral Equipment

Video Sensors (TBD)

Scan Converters

Head-Up Display

Multifunction Displays

Helmet Mounted Display

Tactical Display

Auxiliary Display Units

3.2.3 Interface Identification

The AIDS software interfaces may be categorized into three groups: a) between AIDS software and an AIDS firmware program, b) between AIDS software and an External Avionics Subsystem, and c) between AIDS software and an AIDS program generation program. The interfaces are listed below in these three categories. Descriptions of the interfacing programs and the corresponding interfaces are provided in Section 3.3.4.

3.2.3.1 AIDS Firmware Interfaces

The AIDS software has interfaces with the following AIDS firmware:

Mbus Controller Firmware

Ibus Controller Firmware

Xbus Remote Terminal Firmware

Mass Memory Firmware

Raster Symbol Generator Firmware

Scan Converter Firmware

Signal Processor Firmware

Microprocessor Integrated Control Set Controller (MPICS) Firmware

Briefing Information Entry Device Firmware

Voice Recognizer Firmware

Voice Synthesizer Firmware

Multifunction Display Firmware

Helmet Mounted Display Firmware

Status Advisory Display Firmware

Head-Up Display Firmware

3.2.3.2 External Avionics Subsystems Interfaces

The AIDS software has interfaces with the following External Avionics Subsystems (EAS):

Navigation System (NAV)

Joint Tactical Information Distribution System (JTIDS)

Communications System (COMM)

Universal Locator-Airborne Integrated Data System (ULAIDS)

Solid-State Electrical System (SOSTEL)

Integrated Engine Information System (IEIS)

AEW System

ASW System

3.2.3.3 Program Generation Interfaces

The following are the off-line interfaces between program generation programs and AIDS software programs.

AIDS Command Formatter/Data Processor Integrated Control Set Software

AIDS Display Formatter/AIDS Operational Display Software

AIDS Equipment Formatter/AIDS Operational Display Software

3.3 FUNCTIONAL DESCRIPTION

This section contains a detailed description of the AIDS software functions. The description is presented in the following five subsections. Section 3.3.1 describes the functional characteristics of the AIDS hardware modules. Section 3.3.2 tabulates the input/output requirements of the AIDS data processor. Section 3.3.3, which, according to SECNAVINST 3560.1, should contain block diagrams of the AIDS hardware system, references Section 3.2.1, which does contain these diagrams. Section 3.3.4 describes the functional characteristics of the AIDS software interfaces. Section 3.3.5 introduces the 19 functional modules of the AIDS software.

3.3.1 Equipment Description

This section provides a summary description of the AIDS hardware modules. Block diagrams depicting the interconnections of these modules are presented in Section 3.2.1. For detailed descriptions of these modules, refer to the applicable specification listed in the bibliography.

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3.3.1.1 Data Processor (AN/AYK-14)

Within the AIDS configuration, each MIDER contains an AN/AYK-14 minicomputer, the Navy's standard airborne computer (CDC 72). Its general characteristics include a 16-bit word length, 16 general-purpose registers, fixed and floating point arithmetic, and core and semiconductor type memory. The configuration selected for the AIDS data processor includes 128K words of core memory, with a 900-nanosecond cycle time, an Extended Arithmetic Unit (EAU), a Discrete Interface Module (DIM), and a Bus Extender Module (BEM).

The AN/AYK-14 includes a memory mapping capability which obviates the need for program or data storage to be continuous. System integrity is increased through the designation of specific user page access privileges (i.e., read, write, and execute protect) as well as the designation of only those specific pages actively used by a given task.

During the AIDS system development period, a Computer Control Unit (CCU) will be attached to the AN/AYK-14. The CCU consists of an alphanumeric Cathode Ray Tube (CRT) display and a magnetic tape drive. Interfacing with the AN/AYK-14 through its support equipment channel, the CCU provides debugging and program execution/monitoring capabilities. Interactions with the AN/AYK-14 (via the CCU terminal) include: setting of program breakpoints and traps, monitoring and display of diagnostics, and selectively reading and writing the contents of memory and programmable registers. Initial program loading of the AN/AYK-14 is provided by the CCU tape drive unit.

3.3.1.2 MIDER Bus (Mbus)

Each module in a MIDER is interconnected to a 16-bit parallel bus known as the Mbus. Each attached module, including the data processor AN/AYK-14, interfaces to the bus through a 16K-work, dual-port memory using two interrupt lines. The AN/AYK-14's bus interface interrupt handling is provided by the aforementioned DIM and the dual-port memory access is provided by the BEM. The bus controller is an AIDS microcomputer with interrupt and Direct Memory Access (DMA) control capabilities. It directs control and data between the attached bus elements by referencing each terminal's dual-port memory as its oun primary memory. The Mbus can support up to 14 terminals. The Mbus is completely symmetrical in that no terminal has a preferred status (including the AIDS data processor.)

Data may be transferred between any two terminals attached to the Mbus (GE 78). Transfer of data between source and destination modules is initiated by the source terminal's writing a source command block (SCB) into its dual-port memory together with the setting of its command flag informing the Mbus controller of the completion of this event. An SCB is maintained in a fixed location in each terminal's dual-port memory. It contains detailed control information to the Mbus controller. Upon receiving a terminal-generated interrupt, the controller copies the SCB into its own message processing queue, resets the command flag (allowing the source terminal availability of its SCB), and generates an interrupt to the source terminal. The controller then proceeds to write the SCB into the destination terminal's command block (DCB) and then generates an interrupt to the destination terminal. At this point, the destination terminal stores control information into its DCB (identifying within

its dual-port memory where the data is to be transferred), sets its command flag informing the controller of the completion of this event, and generates an interrupt to the controller. The controller resets the command flag and then moves the data from the source to the destination, whereupon it generates interrupts to both source and destination terminals identifying the completion of the data transaction.

A message destination may include not only any MIDER-resident device, but also an AIDS display (on the Ibus) or any external system interfacing with AIDS (on the Xbus). Identification of the intended destination device in a data transaction is established by the bus controller through the use of its "routing table." This table defines the bus routing requirements for each device; in the event of system degradation, the data processor modifies the routing table to establish the revised routing requirements.

The bus controller has the capability of addressing up to 16K in each terminal's dual-port memory and transmitting variable size messages ranging from 0 to 16K words. A message of length 0 will correspond to the transfer of information solely within a command block itself.

The current estimate of the Mbus transmission time is approximately 100 μsec for message processing overhead with a 5- μsec transfer rate per word. Based upon an estimated AIDS Mbus load factor at 10 percent, the estimated Mbus access time ranges from a minimum of 25 μsec to a maximum of 10 msec.

.3.1.3 Internal Bus (Ibus)

The Ibus provides the interface between a MIDER and the other AIDS components; the displays, the ICSs, the BIED, Voice Recognition, Voice Synthesis and the other MIDER(s). The Ibus is an asynchronous multiplex bus conforming to the MIL-STD-1553 protocol (Air Force 73). This protocol is a command-response protocol applicable to a system in which the bus controller is either the source or destination of most data exchanges.

Command-response protocol requires a bus controller (BC) which issues control directives to all the remote terminals (RTs) connected to the bus. When acting as the data source, the BC sends a "receive" command followed by the specified number of data words to the RT; in response, the destination RT will transmit a "status" command to the BC acknowledging the completion of data reception. When acting as the intended data destination, the BC sends a "transmit" command to the RT; in response, the source RT will transmit a "status" command followed by the specified number of data words to the BC. The BC also can act as the coordinator of data transmissions between two RTs. The BC sends a receive command to the intended destination RT and a "transmit" command to the source RT. The source RT subsequently transmits a "status" command followed by the designated number of data words and the destination responds with a status command.

The Ibus is a dual bus structure with the attached terminals acting in a half duplex mode. Nominally, both buses (known as the A and B bus) are active, the configuration being determined by the data processor. Each resident MIDER contains two Ibus bus controllers, each comprised of an AIDS Digital Terminal and an AIDS Microcomputer. The AIDS Digital Terminal, capable of functioning either as an RT or BC, contains two I/O ports. In either functional mode one

of the ports is active on the A or B bus while the other port "listens" to (i.e., monitors) the other bus activity. Acting in a bus monitor role, the Digital Terminal will assist in the reconfiguration of the AIDS bus structure in the event of a bus failure.

The Ibus is symmetrical in design (analogous to the Mbus) with all the attached terminals having an equal status. The terminals are capable of blocking and unblocking data transmissions in excess of 32 words.

The current estimate of the Ibus transmission time is approximately 50 μsec for message processing overhead with a 20 μsec transfer rate per word. The load factor and access time for the Ibus is TBD.

3.3.1.4 External Bus (Xbus)

The Xbus provides the interface between AIDS and the external avionics subsystems. It is an asynchronous multiplex bus conforming to the MIL-STD-1553 operation protocol. Analogous to the Ibus, the Xbus operates in a command-response configuration; however, the Xbus controller is not resident within the AIDS configuration.

The Xbus timing characteristics are the same as those noted for the Ibus.

3.3.1.5 Video Bus (Vbus)

The Vbus is the AIDS video transmission system. It is able to transmit simultaneously up to eight different channels of video data where each channel has a bandwidth of 17 MHz. Each video source (i.e., raster symbol generators and video sensors) transmits its video at a distinct RF frequency. Each video receiver (i.e., HUD, MPD, and MIDER video receiver) is tunable to any of the video transmission frequencies. Each MIDER includes a video receiver which accepts sensor video and transfers this video to a raster symbol generator for mixing with the generated symbology. The detailed specification of the Vbus is TBD.

3.3.1.6 Mass Memory System

In the AIDS configuration, the mass memory system is a disk memory system (minimum capacity 400,000 words) with an AIDS microcomputer as the mass memory controller. As with other MIDER modules connected to the Mbus, the mass memory Mbus interface is a 16K dual-port memory. Data to be written into mass memory is initially transferred from the source element by the Mbus controller into the mass memory controller's dual-port memory. A write request includes the data's starting address and number of words. The mass memory controller subsequently initiates a DMA transfer of the data, together with identification and control information, to the disk controller's input data buffer. The disk controller then empties its input data buffer onto the designated fixed-length sector blocks of the disk storage device. The mass memory controller will perform the blocking and unblocking of data transmissions, thus providing the mass memory user with a transparent mechanism for referencing the mass memory. That is, the user references the mass memory as a continuous random access memory.

Data to be read (i.e., output) from mass memory is initiated by a read request being sent via the Mbus controller to the mass memory controller's dual-port memory. This read request specifies the starting address, number of words, and destination. A DMA transfer to the disk controller, identifying the requested data, is then performed; the contents of the sector blocks are then placed into the disk controller's output data buffer. This data is subsequently transmitted to the mass memory controller's dual-port memory (via a DMA transfer) and then to the destination specified in the read request. In this manner, the data processor may route data retrieved from mass memory directly to a display or ICS.

The device controller's error detection capabilities include: a write attempt onto protected disk memory, exceeding the addressing limits of the mass memory, the occurrence of data errors (i.e., parity) during read-write operations, and data transmission timing errors. In response to an error's occurrence, the mass memory controller will retry the operation.

The estimated processing time for a mass memory read request with the data processor as the destination is:

o time of read request transmission from source to mass memory controller	= 0.2 msec
o response time of device controller	= 30.0 msec
o transfer rate from device controller to mass memory controller	= 0.002 msec/word
o Mbus transfer rate	= 0.005 msec/word
o Mbus access time (twice)	= 2.0 msec
	32.2 msec + 0.007 msec/word

3.3.1.7 Raster Symbol Generator (RSG)

A MIDER contains from two to four RSGs, each of which accepts a display format program and generates the equivalent raster representation of that display format. The RSG operates at either of two video frame rates: 30 and 50 Hz. Selectable resolution modes will be 525, 875, and 1023 TV lines per video frame. Within the AIDS configuration, the HSD, VSD, HMD, ADU, and TD displays (reference Section 3.3.1.9) are driven by RSGs. During low-level-light day or FLIR night conditions, the HUD is also driven by an RSG. In all instances, the Vbus routes the raster video imagery to the respective displays.

The RSG is one of the three different symbol generators in AIDS; the HUD and SAD symbol generators are the other two. All three conform to the Standard AIDS Display Interface (SADI) (Michener and Shelley 81). SADI display primitives include: lines (solid, dashed, and dotted), text (two sizes), arcs and circles, and shaded symbols. By means of subpictures (subroutines) contained in the SADI program, both symbol clipping and transformation are provided. Symbol attributes are: blinking, variable intensity, line style, and line width.

SADI includes both a display instruction set and a protocol for updating programs written in this instruction set. The interface to a symbol generator includes transmission of both display formats and updates to these formats. The display formats are stored in the mass memory and are transferred by data processor direction to a symbol generator when a new format is required. Updates to a format are generated in the data processor and are transmitted by the data processor directly to the symbol generator.

3.3.1.8 Signal Processor

The signal processor converts acoustic data supplied by the ASW system to include automatic line integration formats, LOFAR grams, and passive B-scans. The detailed specification of the signal processor is TBD.

3.3.1.9 AIDS Displays

The following subsections present a summary discussion of the functional and physical characteristics of the AIDS displays.

Figure 3-3 illustrates the placement of these displays, the ICP, and the MCP for the pilot's station. Figure 3-4 illustrates the mission officer station. (The ADU shown in Figure 3-4 is not included in the AEW mission officer station.)

3.3.1.9.1 Head-Up Display (HUD)

The HUD is the principal AIDS flight display. It consists of a viewing lens mounted between the pilot and the windscreen and a projection unit which projects an image onto the viewing lens. The pilot sees the HUD image superimposed on the real world viewed through the windscreen. The HUD processing operates in two modes: stroke or raster image refresh. In the stroke mode, a stroke symbol generator (residing in the HUD) generates the display image using a SADI display program. In the raster mode, a MIDER-resident RSG (using the same SADI program) provides raster display symbology and optional sensor-generated video over the Vbus. During high ambient light conditions the stroke mode is used; the raster mode may be used only during low ambient light conditions. Figure 3-5 illustrates the HUD, while Figure 3-6 is a representative display format.

3.3.1.9.2 Multifunction Display (MFD)

The MFD function within the AIDS configuration is to display mission and flight data as a combination of raster refresh symbology and sensor-generated video images. Designed for use during high ambient light conditions, the MFD is a monochrome CRT with gray shading capabilities. The MFD has two screen sizes: 5 inches by 7 inches and 6.5 inches by 8.5 inches. The resolution is 800 TV lines at picture center and 650 TV lines at picture corner. Figure 3-7 illustrates the MFD.

In the AIDS configuration, the MFD has specific applications as noted below.

3.3.1.9.2.1 Vertical Situation Display Format (VSD). The VSD displays flight data as a combination of raster symbology and sensor-generated video (e.g., FLIR or LLLTV). The VSD also provides an HUD backup capability. The VSD has a screen size of 5 inches. Figure 3-8 is a representative VSD format.

75357_50

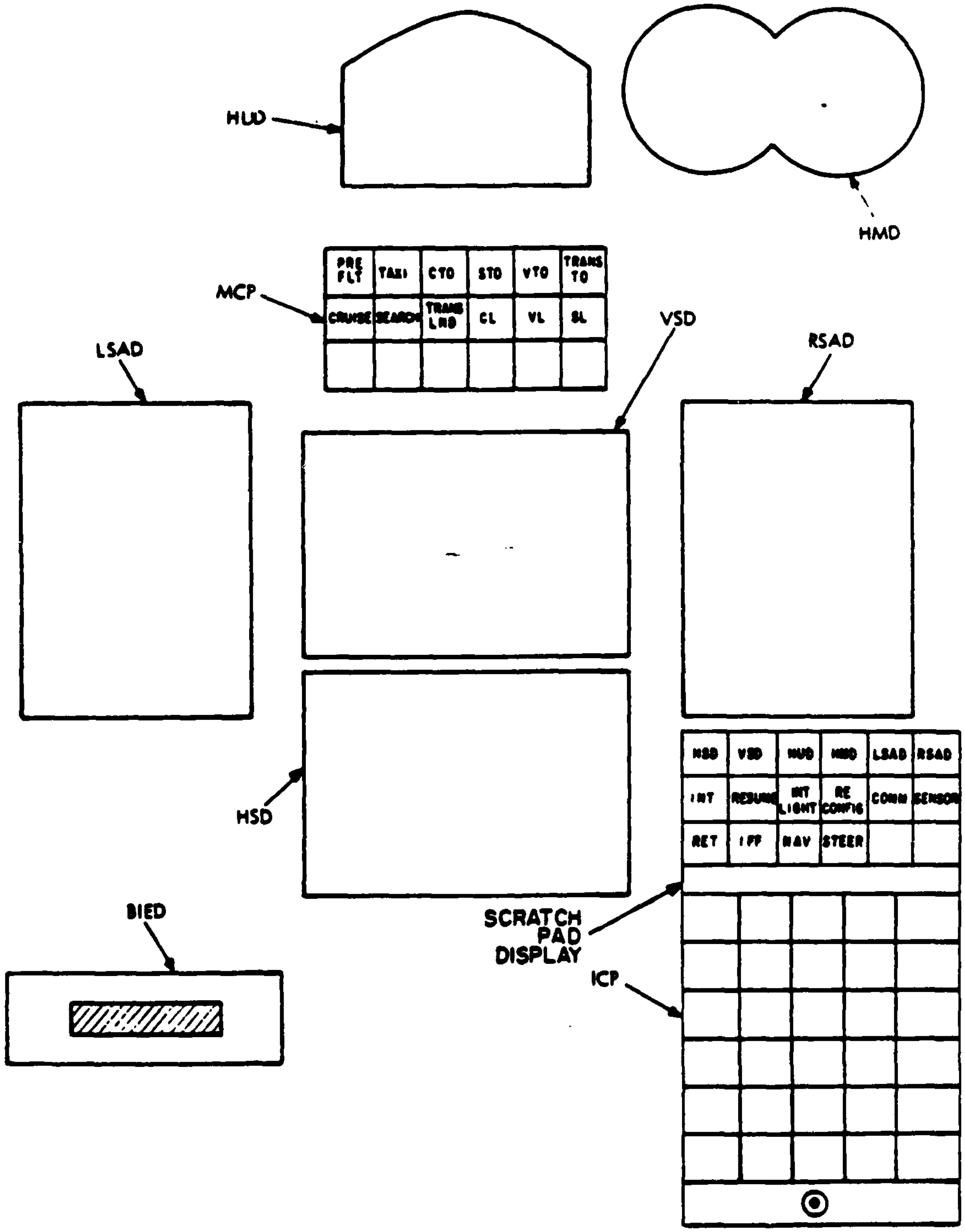

FIGURE 3-3 - Pilot Station Display Placement

75357-50

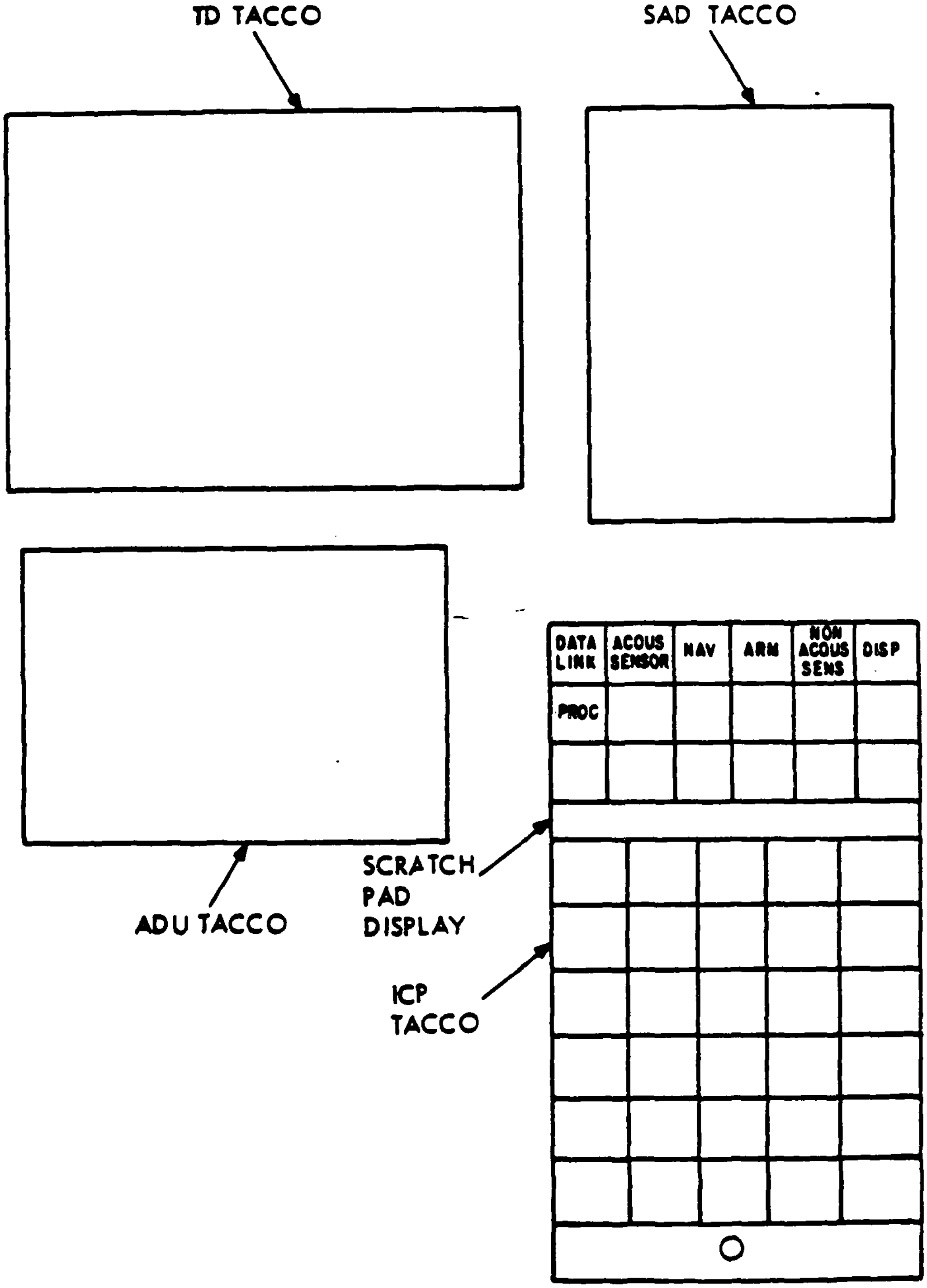

FIGURE 3-4 - Mission Officer Display Placement

75357-50

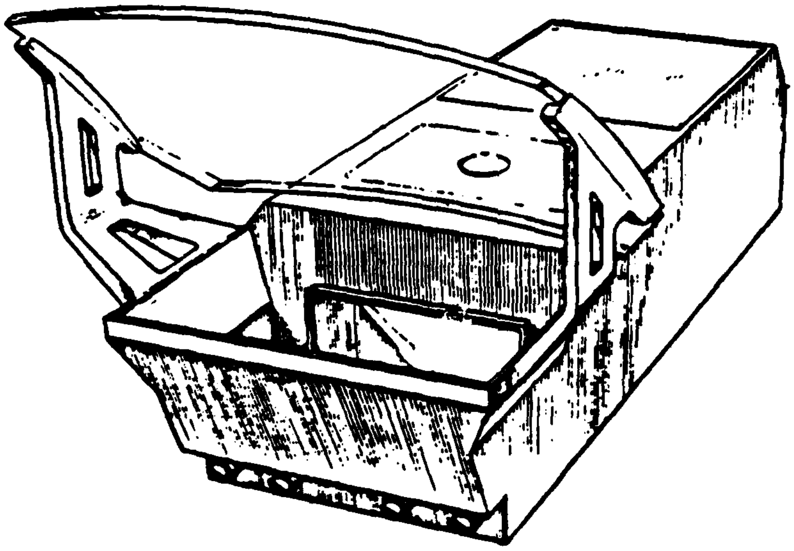

FIGURE 3-5 - AIDS HUD

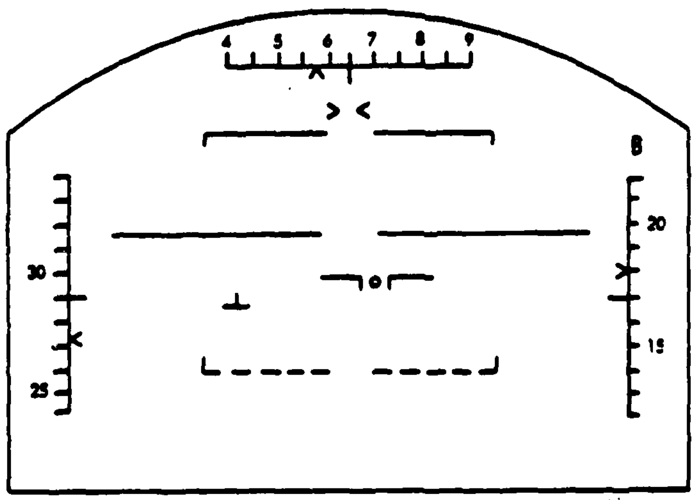

FIGURE 3-6 - Representative HUD Format

75357≡50

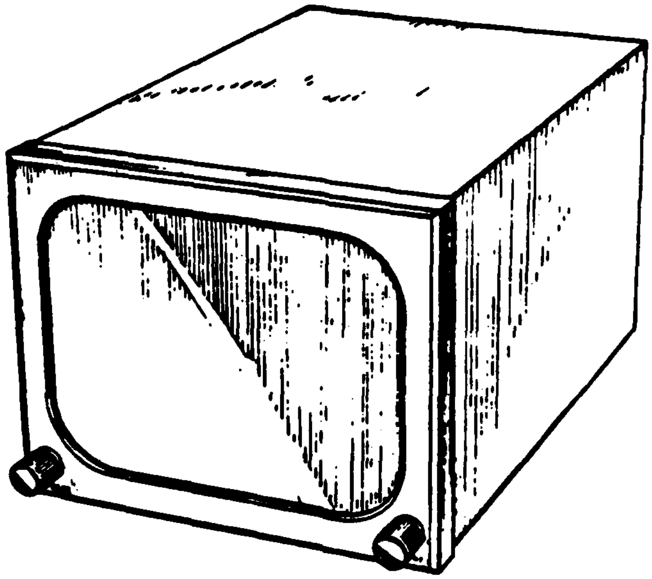

Figure 3-7 - AIDS MFD

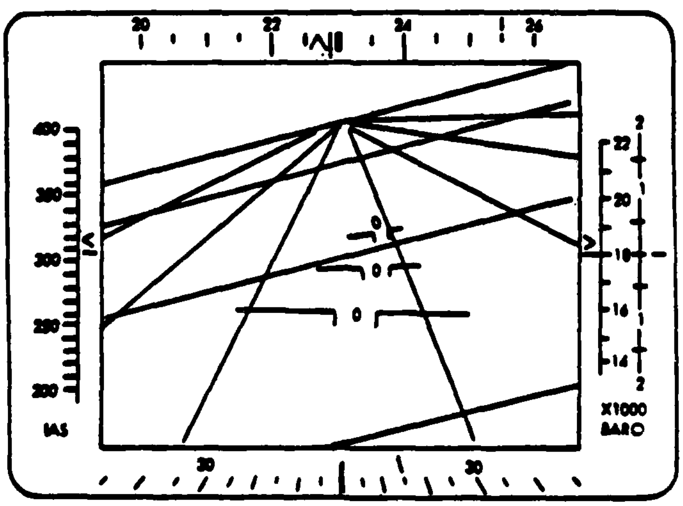

FIGURE 3-8 - Representative VSD Format

3.3.1.9.2.2 Horizontal Situation Display Format (HSD). The HSD displays flight data as a combination of raster symbology superimposed onto either an electronically generated map or a mission flight plan. The HSD has a screen size of 5 inches by 7 inches. The HSD also provides a VSD backup capability. Figure 3-9 is a representative HSD format.

3.3.1.9.2.3 Tactical Display (TD). The TD displays the tactical environment for either the ASW or AEW system. The TD also provides a backup for the ADU. In both systems, each mission officer station includes a TD. The TD has a 6.5 by 8.5 inch screen. The TD formats are TBD.

3.3.1.9.2.4 Auxiliary Display Unit (ADU). The ADU is used in the ASW system to display formatted acoustic data. The ADU also serves as a backup to the TD. The ADU has a 5 by 7 inch screen. The ADU formats are TBD.

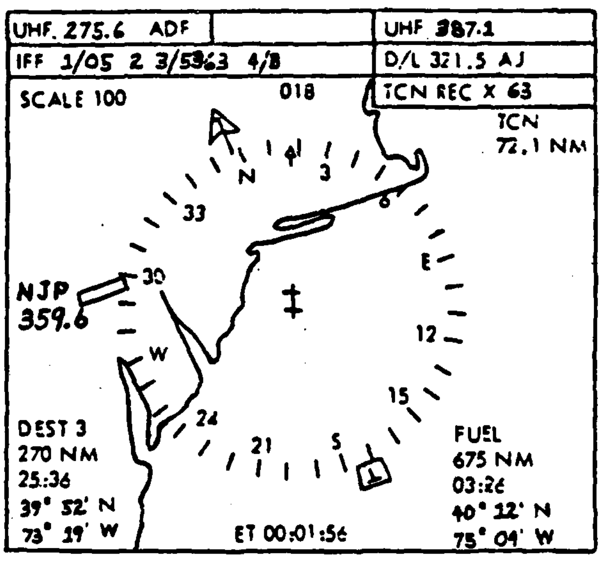

FIGURE 3-9 - Representative HSD Format

3.3.1.9.3 Helmet Display System (HDS)

The AIDS HDS consists of a Helmet Mounted Display (HMD) and a Helmet Position Sensor (HPS). The HMD is comprised of a helmet and visor assembly optically coupled (via a lens system) to a miniature CRT display. The HMD accepts raster imagery, from the Vbus and digital control from the Ibus. It will display symbology onto a viewing area one inch in diameter. Figure 3-10 is a representative HMD format.

The HPS consists of a cockpit mounted radiator assembly and a helmet mounted sensor system coupled to an AIDS microcomputer. The radiator assembly generates a magnetic field which tracks the sensor located in the pilot's helmet as a means of discerning the helmet's position and orientation with respect to the aircraft coordinates. The microcomputer processes pilot mode controls (e.g., boresight and acquisition) from the ICS (via the Ibus) as well as performing the relevant coordinate transformation calculations required to establish the helmet's position and orientation.

3.3.1.9.4 Situation Advisory Display (SAD)

Within the AIDS configuration, the SAD provides an annotation of displays using alphanumeric symbology. For the pilot, it provides system monitoring and engine status information. For the mission officers, it provides selected rack status, equipment status, and data link parameters. Designed for use during high ambient light conditions, the SAD is a monochrome CRT with gray shading capabilities. It has a usable display area of 5 inches by 7 inches with a resolution of 900 TV lines at picture center and 800 TV lines at picture corner. The SAD provides a SADI subset. This subset includes text, vertical and horizontal lines, and symbols; neither subpictures nor attributes are supported. Figure 3-11 illustrates the SAD; Figure 3-12 is a representative SAD format.

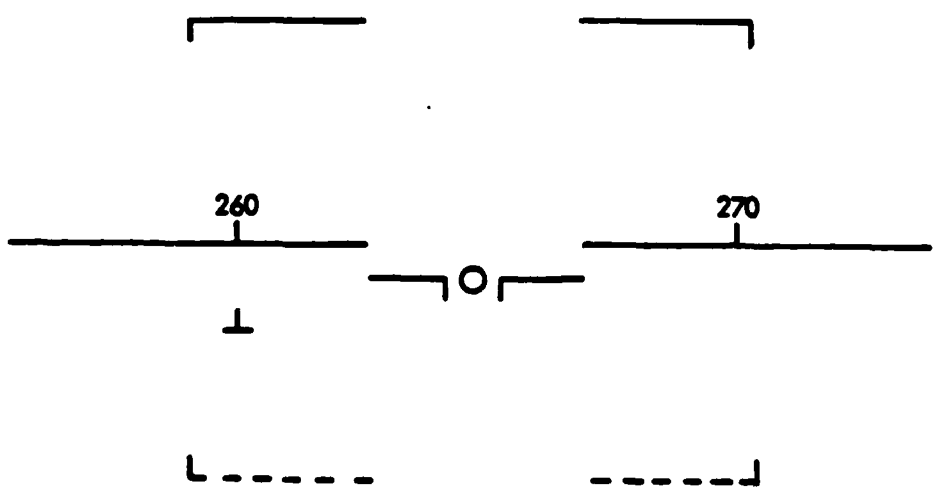

FIGURE 3-10 - Representative HMD Format

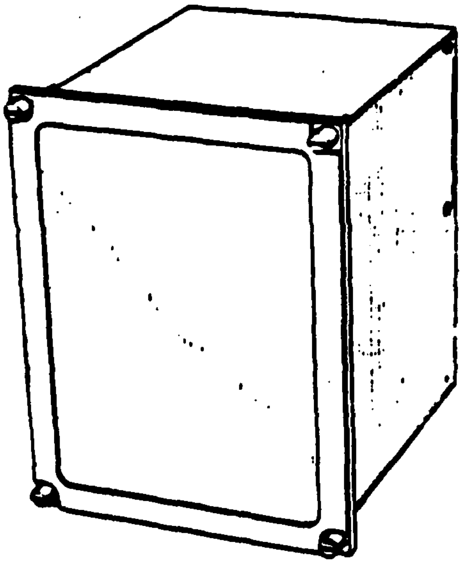

FIGURE 3-11 - AIDS SAD

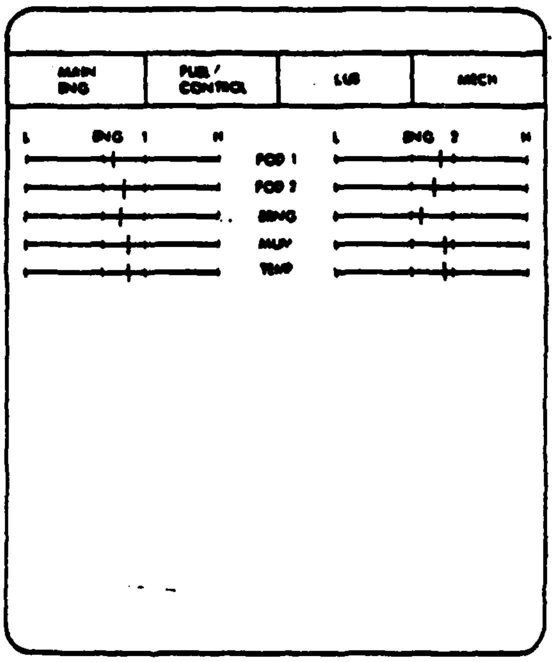

FIGURE 3-12 - Representative SAD Format

3.3.1.10 Integrated Control Set (ICS)

The ICS is the primary input interface from the pilot and mission officers to AIDS and to the external avionic subsystems. The ICS consists of two control panels: an optional Mode Control Panel (MCP) and an Integrated Control Panel (ICP). The ICS contains an AIDS microprocessor which controls both the MCP and ICP while also functioning as an Ibus terminal. The ICS microprocessor software is known as MPICS, while the AIDS data processor software, which interfaces with MPICS, is known as DPICS. The AIDS configuration consists of one MCP and a number of ICPs dependent upon the specific mission configuration.

3.3.1.10.1 Mode Control Panel (MCP)

The MCP is used by the pilot to select the mission mode. The MCP also provides a visual indication of the current mission mode. It consists of 18 touch-activated switches, each mutually exclusive. Depression of a switch causes its dedicated legend to be backlighted, together with the sending of a corresponding switch selection to the ICP. Each legend will consist of two rows of five characters. Figure 3-3 illustrates the MCP.

3.3.1.10.2 Integrated Control Panel (ICP)

The ICP is used to control external avionic systems, to position sensors, to control all the AIDS display formats, and to position the display cursors. It consists of two main groupings of touch-activated switches (dedicated and programmable) and an analog control mechanism. Figure 3-3 illustrates the ICP.

The upper group of 18 fixed-legend switches controls the major system functions and configures the ICP for a specific action sequence. Depression of one of these fixed-legend switches enables the 30 programmable-legend lower group. The legal functions corresponding to the fixed-legend switch will be displayed on the programmable group of legends.

The programmable-legend group provides up to five levels of switch indenture. By convention, "level of indenture" corresponds to the number of switches that must be pushed, including the fixed-legend switch selection, before a specific switch is displayed on the programmable group of legends. During a pilot's command sequence, the legends of all switches activated are displayed on a character scratchpad legend to provide a visual history of the command sequence. In the event that the last switch indenture requires input numerical data, a keyset with a data entry capability will be enabled. Each keyset data entry will be displayed on the scratchpad; by means of a "clear" switch, the keyset entry can be removed from the scratchpad. The previous higher indenture level will be returned to by means of a "Return" switch.

The analog control mechanism is a force stick. When enabled, the force stick periodically generates two digital values whose magnitudes depend upon the force applied to the stick. These digital values (X and Y) are sent periodically to the AIDS data processor where, dependent upon the device the pilot is currently controlling, they are forwarded either to an external avionic subsystem or to a display program.

3.3.1.11 Briefing Information Entry Device (BIED)

The BIED is a microcomputer-controlled magnetic tape cartridge unit used to input briefing information. The input data (specifying the mission) is intended for both AIDS and the external avionic subsystems. An AIDS microcomputer (interfaced to the Ibus) controls the transfer of data from the tape unit as well as performing error detection and Built-in Test Equipment (BITE) tests. The BIED has storage capacity for 48.8K words and a transfer rate of 1.2K words/second. During flight, the BIED may also be used to record limited mission data, thus serving as a debriefing mechanism.

3.3.1.12 Voice Synthesizer

Voice synthesis is a process that electronically converts the output of an AIDS data processor into synthesized human speech. The voice synthesizer is capable of decoding input data (from the AIDS data processor) and transforming it into electronically synthesized speech. Specific capabilities include: a limited vocabulary of the English language, rate adjustment and voice inflection. By means of a remote terminal, the voice synthesizer interfaces with the AIDS Ibus. The tentative voice synthesis applications for the V/STOL mission include the issuing of cautionary and warning outputs during mission fault occurrences and the issuing of flight critical data (e.g., velocity and altitude) during periods of high visual pilot activity (e.g., takeoff and landing).

3.3.1.13 Voice Recognition

Voice recognition is a process that allows the pilot to communicate directly (i.e., talk) with the AIDS data processor. The voice recognizer is capable (in a real-time environment) of identifying an input phrase based upon a comparison with the user's previously established vocabulary. In response to valid identification, display of the command on an AIDS display provides the user with visual verification of the command's recognition.

3.3.2 Digital Processor Input/Output Utilization Tables

Tables 3-1 through 3-4 summarize the AIDS data processor nominal I/O requirements. There is one table for each of the four data processor configurations illustrated in Figures 3-1 and 3-2. These configurations are Data Processor 1, ASW Data Processor 2, ASW Data Processor 3, and AEW Data Processor 2. Note that Data Processor 1 is configured identically in both the AEW and ASW systems. The requirements listed in the tables are nominal in that they represent the I/O performed in a completely operational system. Obviously, the requirements for and allocation of I/O differ for the degraded configurations.

The tables are partitioned into the I/O which occurs on each of the three digital buses used by a data processor (the Mbus, Xbus, and Ibus). The total I/O requirements for the Mbus in each MIDER include the I/O to both the Xbus and Ibus peripherals as well as to the Mbus peripherals. Also, the total requirement for the Ibus is the sum of the requirements in the two AEW tables and the three ASW tables. The values used for the number of input and output

TABLE 3-1. DATA PROCESSOR 1 INPUT/OUTPUT UTILIZATION (Page 1 of 2)

BUS ADDRESS	WORD SIZE	CONNECTED EQUIPMENT	NUMBER OF INPUT WORDS	NUMBER OF OUTPUT WORDS	TRANSFER RATE
		Mbus Peripherals			
TBD	16	Xbus RT 1	~5	~5	Aperiodic
TBD	16	Ibus BC 1,1	~5	~5	Aperiodic
TBD	16	Ibus BC 1,2	~5	~5	Aperiodic
TBD	16	Mass Memory 1	- ~5 to 4000	~20 ~5 to ~20	5Hz Aperiodic
TBD	16	RSG 1,1 (to HUD or HMD)	- - 5	10 to 20 10 to 100 5 to 700	60 Hz 20 Hz Aperiodic
TBD	16	RSG 1,2 (to VSD)	- - ~5	~20 ~100 ~5 to 700	60 Hz Aperiodic
TBD	16	SC 1	~5	~5	Aperiodic
		Xbus Peripherals			
TBD	16	NAV	13 14,26 -	- 2 3	60 Hz 20 Hz Aperiodic
TBD	16	JTIDS	31	-	20 Hz
TBD	16	COMM	- 11 -	2 - 3	20 Hz 5 Hz Aperiodic
TBD	16	IEIS	12,20	-	5 Hz Aperiodic
TBD	16	ULAIDS	TBD -	-	5 Hz Aperiodic
TBD	16	SOSTEL	TBD -	- 3	5 Hz Aperiodic

TABLE 3-1. DATA PROCESSOR 1 INPUT/OUTPUT UTILIZATION (Page 2 of 2)

BUS ADDRESS	WORD SIZE	CONNECTED EQUIPMENT	NUMBER OF INPUT WORDS	NUMBER OF OUTPUT WORDS	TRANSFER RATE
Ibus Peripherals					
TBD	16	HUD	- - ~5	~10 to ~20 100 5 to 700	60 Hz 20 Hz Aperiodic
TBD	16	HMD	- ~5	4 ~5	60 Hz Aperiodic
TBD	16	VSD	~5	~5	Aperiodic
TBD	16	Pilot ICS	~3 ~5	- ~5	20 Hz Aperiodic
TBD	16	LSAD	- ~5	~10 to ~30 ~5 to ~75	5 Hz Aperiodic
TBD	16	RSAD	- ~5	to ~30 ~5 to ~75	5 Hz Aperiodic
TBD	16	BIED	~100	~5	Aperiodic
TBD	16	Voice Recognizer	~5	~3000	Aperiodic
TBD	16	Voice Synthesizer	~5	~5 to 10	Aperiodic
TBD	16	Mbus BC 2	~25	~25	60 Hz
TBD	16	Mbus BC 3	~25	~25	60 Hz

TABLE 3-2. ASW DATA PROCESSOR 2 INPUT/OUTPUT UTILIZATION

BUS ADDRESS	WORD SIZE	CONNECTED EQUIPMENT	NUMBER OF INPUT WORDS	NUMBER OF OUTPUT WORDS	TRANSFER RATE
		Mbus Peripherals			
TBD	16	Xbus RT 2	~5	~5	Aperiodic
TBD	16	Ibus BC 2,1	~5	~5	Aperiodic
TBD	16	Ibus BC 2,2	~5	~5	Aperiodic
TBD	16	Mass Memory 2	- ~5 to ~4000	~20 ~5 to ~20	5Hz Aperiodic
TBD	16	RSG 2,1 (to HSD)	- ~5	~100 ~5	20Hz Aperiodic
TBD	16	RSG 2,2 (to TACCO TD)	- ~5	TBD ~5	0.5Hz Aperiodic
TBD	16	RSG 2,3 (to SENSO TD)	- ~5	TBD ~5	0.5Hz Aperiodic
TBD	16	RSG 2,4 (to SENSO + TACCO TDs)	- ~5	TBD ~5	0.5Hz Aperiodic
		Xbus Peripherals			
TBD	16	NAV	13 14,26	- -	60Hz 20Hz
TBD	16	JTIDS	31	-	20Hz
TBD	16	COMM	11	-	5
TBD	16	ASW	TBD	TBD	TBD
		Ibus Peripherals			
TBD	16	HSD	~5	~5	Aperiodic
TBD	16	TD(TACCO)	~5	~5	Aperiodic
TBD	16	TD(SENSO)	~5	~5	Aperiodic
TBD	16	SAD(TACCO)	~5	TBD	TBD
TBD	16	SAD(SENSO)	~5	TBD	TBD
TBD	16	Mbus BC 1	~25	~25	60Hz
TBD	16	Mbus BC 3	~25	~25	60Hz

TABLE 3-3. ASW DATA PROCESSOR 3 INPUT/OUTPUT UTILIZATION

BUS ADDRESS	WORD SIZE	CONNECTED EQUIPMENT	NUMBER OF INPUT WORDS	NUMBER OF OUTPUT WORDS	TRANSFER RATE
		Mbus Peripherals			
TBD	16	Xbus RT 3	~5	~5	Aperiodic
TBD	16	Ibus BC 3,1	~5	~5	Aperiodic
		Ibus BC 3,2	~5	~5	Aperiodic
		Mass Memory 3	- ~5 to 4000	~20 5 to 20	5Hz Aperiodic
TBD	16	RSG 3,1 (to TACCO ADU)	- ~5	~TBD ~5	0.5Hz Aperiodic
		RSG 3,2 (to SENSO ADU)	- ~5	TBD ~5	0.5Hz Aperiodic
		SP 3,1 (to TACCO ADU)	~5	~5	Aperiodic
		SP 3,2 (to SENSO ADU)	~5	~5	Aperiodic
		Xbus Peripherals			
TBD	16	ASW	TBD	TBD	TBD
		Ibus Peripherals			
		ADU (TACCO)	~5	~5	
		ADU (SENSO)	~5	~5	
		ICP (TACCO)	~3 ~5	~5 ~5	20Hz Aperiodic
		ICP (SENSO)	~3 ~5	- ~5	20Hz Aperiodic
		Mbus BC 1	~25	~25	60Hz
		Mbus BC 2	~25	~25	60Hz

TABLE 3-4. AEW DATA PROCESSOR 2 INPUT/OUTPUT UTILIZATION (Page 1 of 2)

BUS ADDRESS	WORD SIZE	CONNECTED EQUIPMENT	NUMBER OF INPUT WORDS	NUMBER OF OUTPUT WORDS	TRANSFER RATE
		Mbus Peripherals			
TBD	16	Xbus RT 2	~5	~5	Aperiodic
TBD	16	Ibus BC 2,1	~5	~5	Aperiodic
TBD	16	Ibus BC 2,2	~5	~5	Aperiodic
TBD	16	Mass Memory 2	~5 to 4000	~20 ~5 to 20	5 Hz Aperiodic
TBD	16	RSG 2,1 (to HSD)	- 5	100 5	20 Hz Aperiodic
TBD	16	RSG 2,2 (to CICO TD)	- 5	TBD 5	0.5 Hz Aperiodic
TBD	16	RSG 2,3 (to AC01 TD)	- ~5	TBD ~5	0.5 Hz Aperiodic
TBD	16	RSG 2,4 (to AC02 TD)	- ~5	TBD ~5	0.5 Hz Aperiodic
TBD	16	SC 2,1	~5	~5	Aperiodic
TBD	16	SC 2,2	~5	~5	Aperiodic
TBD	16	SC 2,3	~5	~5	Aperiodic
		Xbus Peripherals			
TBD	16	NAV	13 14,26	- -	60 Hz 20 Hz
TBD	16	JTIDS	31	-	20 Hz
TBD	16	COMM	11	-	5 Hz
TBD	16	AEW	TBD	TBD	TBD

TABLE 3-4. AEW DATA PROCESSOR 2 INPUT/OUTPUT UTILIZATION (Page 2 of 2)

BUS ADDRESS	WORD SIZE	CONNECTED EQUIPMENT	NUMBER OF INPUT WORDS	NUMBER OF OUTPUT WORDS	TRANSFER RATE
		Ibus Peripherals			
TBD	16	HSD	~5	~5	Aperiodic
TBD	16	TD(CICO)	~5	~5	Aperiodic
TBD	16	TD(AC01)	~5	~5	Aperiodic
TBD	16	TD(AC02)	~5	~5	Aperiodic
TBD	16	SAD(CICO)	~5	TBD	TBD
TBD	16	SAD(AC01)	~5	TBD	TBD
TBD	16	SAD(AC02)	~5	TBD	TBD
TBD	16	ICP(CICO)	~3 ~5	- ~5	20 Hz Aperiodic
TBD	16	ICP(AC01)	~3 ~5	- ~5	20 Hz Aperiodic
TBD	16	ICP(AC02)	~3 ~5	- -	20 Hz Aperiodic
TBD	16	Mbus BC 1	~25	~25	60 Hz

words and the transfer rates are derived from the description of the program interfaces described in Section 3.3.4. If an input or output message is of variable size, the number of words is expressed as a range, for example, "5 to 4000." If, on the other hand, there are multiple fixed-size messages, each message is listed separately, for example "12, 20."

Included as aperiodic output words to each of the symbol generators are the words required to load the symbol generator with a new format. These words are not actually transmitted from the data processor; rather they are transmitted from the mass memory. The words are included in these tables for completeness.

For the Mbus peripherals, a numbering scheme is used to uniquely identify each component. Each component name is followed by a digit identifying the MIDER. Further, if the component is duplicated in the MIDER, a second digit is used.

3.3.3 Digital Processor Interface Block Diagram

For the AEW and ASW versions of AIDS, Figures 3-1 and 3-2 in Section 3.2.1 illustrate the interconnection of the AIDS hardware modules and the connections between AIDS and external sensors and subsystems.

3.3.4 Program Interface Descriptions

The AIDS program interfaces may be divided into three groups: the interfaces between AIDS software and AIDS firmware programs, the interfaces between AIDS software programs and the external avionics subsystems, and the off-line interfaces between AIDS software programs and program generation programs.

This section describes the purpose of each interface. The details of the interfaces will be contained in Interface Design Specifications. The interface details are currently TBD. In each following subsection, each interface is introduced in a paragraph. The introductory paragraphs are followed by a table which lists, for each interface, the physical character of the interface, the logical data transferred over the interface, and estimates of the data volume and interface bandwidth. The data volume is the number of 16-bit words required for the data. The bandwidth is the number of 16-bit words per second. If an interface is used only for program loading or to report exception conditions, its bandwidth is described as "Nil." For descriptive purposes in the tables only, one of the interfacing programs is labeled the "A Side"; the other is labeled the "B Side."

3.3.4.1 AIDS Firmware Interface Descriptions

For the interfaces listed below, the two programs which logically interface are described as the interfacing programs. In actuality, several programs may be involved in the interface. For example, the interface defined as the "DPICS/MPICS" interface requires an interface between OSS and the Mbus controller, an interface between the Mbus controller and the MIDER Ibus terminal, and an interface between the MIDER Ibus controller and the ICS Ibus terminal.

The AIDS operational interfaces are:

a. The Operational Support Software (OSS)/Mbus Controller interface provides the OSS with I/O access to all the equipment connected to the Mbus, Ibus, and Xbus. The interface includes a unique address for all equipment on all the buses. Thus the OSS may transmit messages to all the equipment as if they were attached to a single bus. The Mbus controller is responsible for knowledge of the actual us addresses and the individual bus protocols. The Mbus controller also allows the OSS to transmit messages whose sizes are larger than those allowed on the various buses. The Mbus controller partitions a large message into a linked set of messages whose sizes conform to bus requirements.

b. The OSS/Ibus Controller interface provides the OSS with control over which Ibus and Ibus controller the data processor uses for communicating with Ibus peripherals. The interface also provides the OSS with Ibus controller and Ibus status.

c. The OSS/Xbus Terminal interface provides the OSS with control over which Xbus the data processor uses for communicating with the external avionics subsystems on the Xbus. The interface also provides the OSS with the Xbus and Xbus terminal status.

d. The OSS/Mass Memory system interface allows the OSS to access variable-length blocks at random addresses in the mass memory. The access may be a write access or a transmit access. A transmit access directs the mass memory controller to transmit the contents of a set of blocks to a specified destination. Examples of data transmissions are transmitting a display format to a symbol generator and transmitting a program module to the data processor.

e. The Operational Display Software (ODS) Raster Symbol Generator interface provides the raster symbol generators with ODS-selected formats and ODS-generated format updates. The interface conforms to SADI.

f. The ODS/Scan Converter interface provides the scan converter with radar sensor control commands and video routing commands, and provides ODS with scan converter status messages.

g. The ODS/Signal Processor interface provides the signal processor with control commands for formatting acoustic data according to mission officer requested formats. The interface provides the ODS with signal processor status messages.

h. The DPICS/MPICS interface DPICS with commands and status input from MPICS and provides MPICS with error messages generated by DPICS.

i. The OSS/BIED interface provides the OSS with the mission description records on the BIED and provides the BIED with read and rewind commands.

j. The OSS/Voice Recognizer interface provides the OSS with recognized commands and voice recognizer status and provides the voice recognizer with crewmember voice profiles.

k. The OSS/Voice Synthesizer interface provides the voice synthesizer with phrases to synthesize and with desired voice characters and provides the OSS with the voice synthesizer status.

l. The ODS/Multifunction Display System interface provides the MFD with video channel selection commands and provides the ODS with MFD status. This interface is used for the VSD, HSD, each TD, and each ADU.

m. The ODS/HDS interface provides the HDS with video channel selection commands and with helmet display system positioning mode commands. The interface provides the ODS with helmet position and with HDS status.

n. The Operational Display Software/Status Advisory Display (ODS/SAD) interface provides the SADs with ODS-selected formats and ODS-generated format updates. The interface conforms to SADI.

o. The ODS/HDS interface provides the HUD with ODS-selected formats and ODS-generated format updates. The interface conforms to SADI. The ODS/HUD interface also provides the HUD with commands which designate either stroke or raster mode and, for raster mode, with video channel selection commands, when operating in stroke mode.

p. The OSS/MIDER interface provides for inter-MIDER information exchange. The interface comprises periodic messages transmitted in both directions which describe both the status of all the MIDER components and the processing functions currently being performed in the MIDER.

The contents of the AIDS software/AIDS firmware interfaces are described in Table 3-5.

3.3.4.2 <u>External Avionic Subsystems Interface Descriptions</u>

AIDS has interfaces with a variety of external avionic subsystems. These subsystems provide AIDS with navigation, communication, command and control, aircraft status information, and mission data. AIDS will supply these subsystems with crew commands communicated through the ICS and voice recognition.

The AIDS external interfaces are:

a. The AIDS/NAV interface provides AIDS with navigation data. AIDS provides NAV with pilot inputs regarding navigation updates.

b. The AIDS/JTIDS interface provides AIDS with command and control information transmitted to the aircraft from shore-based, ship-based, or air-based command and control centers. JTIDS also provides TACAN data. AIDS provides JTIDS with pilot commands regarding control of JTIDS.

c. The AIDS/COMM interface provides AIDS with the current assignments of the UHF, VHF, IFF, and radar beacon. AIDS provides COMM with pilot commands for controlling the communication equipment.

d. The AIDS/IEIS interface provides AIDS with the status of the aircraft engines.

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TABLE 3-5. AIDS FIRMWARE INTERFACES (Page 1 of 7)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
OSS	Mbus Con-troller	AN/AYK-14 Bus Extender Module (BEM) and Discrete Interface Module (DIM)	Source Command: Priority Destination Message Number Source Start Address Message Length Source Source Completion Identifier	7	Nil	Destination Command: Destination Message Number Message Length	3	Nil
						Message Contents	1 to TBD	Nil
			Messages Contents	1 to 1000	Nil			
			Destination Command: Destination Start Address Destination Comple-tion Identifier	2	Nil			
OSS	Ibus Con-troller	Mbus	Control Commands: TBD	5	Nil	Status Message: TBD	5	Nil
OSS	Vbus terminal	Mbus	Control Commands: TBD	5	Nil	Status Message: TBD	5	Nil
OSS	Mass Memory System	Mbus	Write Request: Address Word Count Data	5 to 20	Nil	Read Message: Status Data	5 to 4000	Nil

TABLE 3-5. AIDS FIRMWARE INTERFACES (Page 2 of 7)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
OSS	Mass Memory System	Mbus	(continued) Read Request: Destination Address Word Count	5	Nil	(continued) Status Message: TBD	5	Nil
ODS	RSG	Mbus	HUD Formats:			Status Message	5	Nil
			Taxi					
			SADI Program	~50	Nil			
			Updates	~10	~200			
			Takeoff/Cruise					
			SADI Program	~700	Nil			
			Updates	~100	~2000			
			Transition					
			SADI Program	~500	Nil			
			Updates	~75	~1500			
			Landing					
			SADI Program	~700	Nil			
			Updates	~100	~2000			
			HMD Formats:					
			Normal					
			SADI Program	~100	Nil			
			Updates	~20	~120			
			Search					
			SADI Program	~100	Nil			
			Updates	~20	~120			

TABLE 3-5. AIDS FIRMWARE INTERFACES (Page 3 of 7)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
ODS	RSG	Mbus	(continued) VSD Formats: Pitch Ladder SADI Program Updates	~700 ~100	N11 ~2000			
			Predictive SADI Program Updates	~1000 ~100	N11 ~2000			
			HSD Format: SADI Program Updates	~1500 ~500	N11 ~3000			
			SENSO TD Formats TBD	TBD	TBD			
			SENSO ADU Formats TBD	TBD	TBD			
			TACCO TD Formats TBD	TBD	TBD			
			TACCO ADU Formats TBD	TBD	TBD			
			CICO TD Formats TBD	TBD	TBD			
			ACO TD Formats TBD	TBD	TBD			

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TABLE 3-5. AIDS FIRMWARE INTERFACES (Page 4 of 7)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
ODS	Scan Converter Software	Mbus	Control Commands: TBD	5	Nil	Status Message:	5	Nil
ODS	Signal Processor	Mbus	Control Commands: TBD	5	Nil	Status Message: TBD	5	Nil
DPICS	MPICS	Ibus	Error Message: TBD	5	Nil	Command Index Value	5	Nil
						Force Stick Reading	5	100
						Status Message: TBD	5	Nil
OSS	BIED	Ibus	Control Commands: TBD	5	Nil	Data Records	1 to 1000	Nil
OSS	Voice Recog-nizer	Ibus	Control Commands: TBD	5	Nil	Voice Commands: TBD	5	Nil
			Voice Profile: TBD	~3000	Nil	Status Message: TBD	5	Nil
OSS	Voice Synthe-sizer	Ibus	Voice Characteristic Controls: TBD	5	Nil	Status Message: TBD	5	Nil
			Voice Messages: TBD	10	Nil			

TABLE 3-5. AIDS FIRMWARE INTERFACES (Page 5 of 7)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
ODS	MPD	Ibus	Video Control Commands: TBD	5	Nil	Status Message: TBD	5	Nil
ODS	HMD	Ibus	Video Control Commands: TBD	5	Nil	Position Message: x axis direction cosine y axis direction cosine z axis direction cosine	4	240
			Position Sensing Controls: TBD	5	300	Status Message: TBD	5	Nil
ODS	SAD	Ibus	Checklist Generic SADI Program Updates	~750 ~10	Nil ~50	Status Message: TBD	5	Nil
			Equipment Monitoring Generic Single Status List SADI Program Updates	~750 ~30	Nil ~150			
			Generic Dual Status List SADI Program Updates	~750 ~45	Nil ~225			

TABLE 3-5. AIDS FIRMWARE INTERFACES (Page 6 of 7)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
ODS	SAD	Ibus	(continued) Engine Start SADI Program Updates	 ~300 ~10	 Nil ~50			
			COMM SADI Program Updates	 ~300 ~10	 Nil ~50			
			TACCO SAD Formats: TBD	TBD	TBD			
			SENSO SAD Formats: TBD	TBD	TBD			
			CICO SAD Formats: TBD	TBD	TBD			
			ACO SAD Formats: TBD	TBD	TBD			
ODS	HUD	Ibus	Mode Commands: TBD	5	Nil	Status Message: TBD	5	Nil
			Video Control Commands: TBD	5	Nil			
			HUD Formats: Taxi SADI Program Updates	 ~50 ~10	 Nil ~200			

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TABLE 3-5. AIDS FIRMWARE INTERFACES (Page 7 of 7)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
ODS	HUD	Ibus	Takeoff/Cruise					
			SADI Program	~700	Nil			
			Updates	~100	~2000			
			Transition					
			SADI Program	~500	Nil			
			Updates	~75	~1500			
			Landing					
			SADI Program	~700	Nil			
			Updates	~100	~2000			
OSS	Other Mider	Ibus and Mbus	Status Message: TBD	~25	~1500	Status Message: TBD	25	1500

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e. The AIDS/ULAIDS interface provides AIDS with the status of all aircraft equipment not controlled by one of the other external avionic subsystems. This equipment includes cockpit environment control, fuel, flaps, and landing gear. ULAIDS also serves as the flight data recorder; consequently, AIDS will periodically provide ULAIDS with the AIDS system status.

f. The AIDS/SOSTEL interface provides AIDS with the status of the aircraft's electrical supply system.

g. The AIDS/AEW interface provides AIDS with the tactical data base. AIDS provides AEW with mission officer control of the AEW system.

h. The AIDS/ASW interface provides AIDS with processed acoustic data and with a tactical data base. AIDS provides ASW with mission officer control of the ASW system.

The contents of the AIDS/external avionics subsystem interfaces are described in Table 3-6.

3.3.4.3 Program Generation Interface Descriptions

The program generation interfaces are not real-time interfaces. Rather, they involve inclusion of the tables generated by the AIDS formatting components into AIDS software modules. Whether the tables are included before or after compilation of the module is TBD.

a. The AIDS Display Formatter (ADF)/ODS interface provides AIDS with format tables for all the AIDS formats. These tables result from the translation of GRADS descriptions of the AIDS formats. For each format, the ADF generates two files which are stored in the AIDS mass memory. One contains the SADI program corresponding to the format; the other contains the data required to dynamically change and update the SADI program. During the mission, the SADI program file is loaded into and executed by a symbol generator and the change data file is loaded into and referenced by the AIDS software. The ADF/AIDS interface detailed description is TBD.

b. The AIDS Command Formatter (ACF)/DPICS interface provides DPICS with the command tables which describe the required interpretation of all the possible ICP inputs. These tables result from the translation of the ACOL specification of the permissible ICP input sequences. A separate command table is stored on the mass memory for each possible ICP configuration (i.e., pilot, TACCO, SENSO, CICO, and ACO). Each command table contains for each command the command's ultimate destination, a command code, and an indication of whether the command includes a keyset entered value or whether the command invokes the force stick. The ACF/DPICS interface is defined in the "AIDS Command Formatter User's Guide" (King 80).

c. The AIDS Equipment Formatter (AEF)/ODS interface provides ODS with High Order Language (HOL) declarations of the equipment-monitoring data base. This equipment-monitoring data base contains a hierarchical specification of all the aircraft's equipment, the warning and caution tolerance values for each equipment, and an indication of which display formats contain which equipment status

TABLE 3-6. EXTERNAL AVIONICS SUBSYSTEM INTERFACES (Page 1 of 6)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
AIDS	NAV	Xbus	Pilot Controls: NAV On NAV Off Latitude Alignment Longitude Alignment Shore Based Align Mode Carrier Based Align Mode Ship Speed Align Ship Heading align Quick Alignment Mode TACAN Fix TACAN Waypoint Visible Fix Mode Visible Fix Designate Radar Fix TACAN Channel Select TACAN Volume TACAN Receive Mode TACAN T/R Mode Radar Altimeter Command Heading Command Airspeed Command Course Command Altitude	3	Nil	Message 1: Roll Pitch True Heading North Velocity East Velocity Vertical Velocity	13	780
						Message 2: Latitude Longitude Barometric Altitude Radar Altitude Command Altitude Ground Speed True Airspeed Indicated Airspeed Command Airspeed Mach Number Command Heading Command Course Navigation Mode	26	520
						Message 3: Wind Speed Wind Bearing Angle of Attack Slip Indicator TACAN Deviation Magnetic Heading	14	280

TABLE 3-6. EXTERNAL AVIONICS SUBSYSTEM INTERFACES (Page 2 of 6)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
AIDS	JTIDS	Xbus	Pilot Control: TBD	3	Nil	Message 1: Latitude Longitude Command Altitude Grid Azimuth Command Heading Command Course TACAN Range TACAN Bearing Time of Day JTIDS Status Runway Heading Glideslope Error Localizer Error Reference Latitude Reference Longitude Waypoint Identifier	31	620
AIDS	COMM	Xbus	Pilot Controls: UHF 1 on UHF 1 off Stick channel A channel select Stick channel A frequency select UHF 1 Volume adjust UHF 1 Squelch adjust Assign UHF 1 to upper antenna	3	Nil	COMM Assignment Message: UHF 1 on/off UHF 1 channel UHF 1 frequency UHF 2 on/off UHF 2 channel UHF 2 frequency VHF channel VHF frequency IFF on/off Mode 1 on/off	15	75

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TABLE 3-6. EXTERNAL AVIONICS SUBSYSTEM INTERFACES (Page 3 of 6)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
AIDS	COMM	Xbus	(continued) Assign UHF 1 to lower antenna UHF 1 Tone adjust Stick channel B channel select Stick channel B frequency select UHF 2 on UHF 2 off UHF 2 Volume Adjust UHF 2 Squelch Adjust Assign UHF 2 to upper antenna Assign UHF 2 to lower antenna UHF 2 Tone Adjust Radar Beacon on Radar Beacon off Radar Beacon Standby Radar Beacon 1 response Radar Beacon 2 response Radar Beacon Code IFF on IFF off IFF Sensitivity Low IFF Sensitivity Norm IFF to Emergency Mode Mode 1 on Mode 1 off Mode 1 code			(continued) Mode 2 on/off Mode 3A on/off Mode 3C on/off Mode 4 on/off Mode 1 Code Mode 2 Code Mode 3A Code Mode 3C Code Mode 4 Code Beacon on/off Beacon Code COMM/IFF Status		

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TABLE 3-6. EXTERNAL AVIONICS SUBSYSTEM INTERFACES (Page 4 of 6)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
AIDS	COMM	Xbus	Mode 2 on Mode 2 off Mode 2 code Mode 3A on Mode 3A off Mode 3A code Mode 3C on Mode 3C off Mode 3C code Mode 4 on Mode 4 off Mode 4 code					
AIDS	IEIS	Xbus	Pilot Controls: TBD	3	Nil	Engine Status Message 1: IEIS Status Core Speed 1 Core Speed 2 Turbine Blade Temp 1 Turbine lade Temp 2 Fuel Flow 1 Fuel Flow 2 Oil Pressure 1 Oil Pressure 2 Mass Unbalance 1 Mass Unbalance 2 Main Engine Status	12	60

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TABLE 3-6. EXTERNAL AVIONICS SUBSYSTEM INTERFACES (Page 5 of 6)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
AIDS	IEIS	Xbus				Engine Status Message 2: IEIS Status A/B Fuel Flow 1 A/B Fuel Flow 2 In Guide Vane Pos 1 In Guide Vane Pos 2 Oil Level 1 Oil Level 2 Oil Temp 1 Oil Temp 2 Oil Quality 1 Oil Quality 2 Oil Flow 1 Oil Flow 2 FOD 1-1 FOD 1-2 FOD 2-1 FOD 2-2 Bearing Condition 1 Bearing Condition 2 Bearing Temp. 1 Bearing Temp. 2	20	100
AIDS	ULAIDS	Xbus	Pilot Controls: TBD	3	Nil	Periodic Status Messages: TBD Sensor Values	~30	~150
						Asynchronous Failure Message: TBD	~5	Nil

TABLE 3-6. EXTERNAL AVIONICS SUBSYSTEM INTERFACES (Page 6 of 6)

PROGRAMS		HARDWARE DEVICE	A SIDE GENERATED DATA			B SIDE GENERATED DATA		
A SIDE	B SIDE		CONTENT	VOLUME	BAND-WIDTH	CONTENT	VOLUME	BAND-WIDTH
AIDS	SOSTEL	Xbus	Pilot Controls: TBD	3	Nil	Periodic Status Message: TBD	~30	~150
						Asynchronous Message: TBD	~5	Nil
AIDS	AEW	Xbus	Mission Officer Controls: TBD	3	Nil	Periodic Data Base Updates: TBD	~6000	~3000
						Intercept Data: TBD	~2250	~1125
						Alerts: TBD	~20	~100
AIDS	ASW	Xbus	Mission Officer Controls: TBD	3	Nil	Acoustic Format Data: TBD	TBD	100K

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values. The details of the AEF/ODS interface are TBD. A description of the AEF is contained in the "AIDS Operational Display Software Program Performance Specification" (Roth 77).

3.3.5 Functional Description

This section introduces the 19 functional components of the AIDS software. Detailed specifications of the inputs, processing, and outputs of each of these functions are contained in the Section 3.4 subsections. Table 3-7 summarizes the functional processing required for the pilot displays in the V/STOL aircraft. The corresponding tables for the ASW and AEW crew stations are TBD. These tables contain the essences of the processing that must be performed by the functions described in this section. The column entries in these tables reference the display formats that are described in Sections 3.4.15, 3.4.16, and 3.4.17.

The AIDS software consists of "application programs" and "support software." The application programs are a set of information processing subsystems, each of which is responsible for a different class of aircraft or mission information display. These subsystems for the V/STOL aircraft are: flight data display, equipment monitoring, communication data display, AEW display, and ASW display. Together, these subsystems constitute the Operational Display Software (ODS). The support software includes all the procedures which provide common services to each of the ODS subsystems. The Operational Support Software (OSS) is a combination of all these procedures.

The OSS provides the environment in which the applications software runs. This environment may be considered a virtual machine with a well-defined software interface, which is applicable to a wide variety of processor and system architectures. When the underlying physical machine changes, the software interface to the virtual machine will remain the same.

The services provided by the OSS may be divided into four general categories: executive functions, input/output functions, file system functions, and reconfiguration control. Executive functions include processor and primary memory allocation and intertask communication and coordination. The input/output functions govern all transactions between an AIDS data processor and any external device. File system functions provide access to data organized as units of related information. The reconfiguration control functions maintain alternative sources for critical data and help the applications functions to determine which peripherals are usable.

The OSS is divided into three levels: the lowest level of the support software is SDEX/M; the next level, the AIDS Operating System; and the highest level, the device-specified I/O controllers. SDEX/M is a standard real-time executive for the AN/AYK-14 and the AN/UYK-20 computers (NAVELEX 78), and as such it provides the operating system environment necessary to support the execution of CMS-2M and assembly language programs for the AIDS. The executive provides services such as initialization, task management, task synchronization, I/O handling, event management which includes both interrupt and error handling, and system monitoring. Inherent in the task management service is memory management and memory mapping capabilities which are transparent to the user. SDEX/M is under joint configuration control of NAVELEX and NAVAIR and will be Government-furnished to the software designer.

TABLE 3-7. PILOT DISPLAY REQUIREMENTS SUMMARY

MISSION MODE	SYSTEM STATE	HMD	HUD	VSD	HSD	RSAD	LSAD
N/A	POWER ON PROGRAM LOAD COMPLETE	TEST PATTERN	TEST PATTERN	TEST PATTERN	TEST PATTERN	TEST PATTERN	TEST PATTERN
PREFLIGHT	AIDS TURN ON, SELF TEST OK	-	-	-	NAVIGATION	INTERIOR INSPECTION CHECKLIST	-
	INTERIOR INSPECTION CHECKLIST	-	-	-		BRIEFING DATA ENTRY CHECKLIST	
	BRIEFING CHECKLIST VERIFIED	-	-	-		ENGINE START CHECKLIST	ENGINE START
	ENGINE START CHECKLIST VERIFIED	-	-	-		POST START CHECKLIST	ENGINE STATUS SUMMARY
TAXI	ENGINE POST START CHECKLIST VERIFIED	NORMAL	TAXI	-		TAXI CHECKLIST	
CONVENTIONAL TAKE OFF	TAXI CHECKLIST VERIFIED		TAKE OFF/ CRUISE	PITCH LADDER		SHORT TAKE OFF CHECKLIST	
	SHORT TAKE OFF CHECKLIST VERIFIED					SYSTEM STATUS SUMMARY	
VERTICAL TAKE OFF	TAXI CHECKLIST VERIFIED					VERTICAL TAKE OFF CHECKLIST	
	VERTICAL TAKE OFF CHECKLIST VERIFIED					SYSTEM STATUS SUMMARY	
SHORT TAKE OFF	TAXI CHECKLIST VERIFIED					SHORT TAKE OFF CHECKLIST	
	SHORT TAKE OFF CHECKLIST VERIFIED					SYSTEM STATUS SUMMARY	
TRANSITION TO TAKE OFF	N/A					SYSTEM STATUS SUMMARY	
CRUISE	N/A						
SEARCH	N/A	SEARCH					
TRANSITION TO LANDING	N/A	NORMAL	TRANSITION	PREDICTIVE		SYSTEM STATUS SUMMARY	
CONVENTIONAL LANDING	N/A		LANDING			SYSTEM STATUS SUMMARY	
VERTICAL LANDING	N/A					VERTICAL CHECKLIST	
	VERTICAL CHECKLIST VERIFIED					SYSTEM STATUS SUMMARY	
SHORT LANDING	N/A					SHORT LANDING CHECKLIST	
	SHORT LANDING CHECKLIST VERIFIED					SYSTEM STATUS SUMMARY	

NOTE: - INDICATES BLANK DISPLAY

The level of the OSS above SDEX/M is the AIDS Operating System (AOS). The AIDS Operating System includes all those mission-specific functions normally allocated to an operating system which are not included in the SDEX/M Executive. For AIDS, these functions are: Mbus I/O, a file system which utilizes the mass memory system, performance monitoring, system initialization, reconfiguration, and overlay processing.

The highest level of the OSS contains the device drivers for each of the different AIDS hardware modules. Note that each of these drivers uses the Mbus I/O function of the AIDS Operating System. The device drivers' functions are: Briefing Information Entry, ICS switch processing, ICS force stick processing, Hands-on-Throttle-and-Stick (HOTAS) processing, voice recognition, Graphic Real-Time Application Display Support (GRADS), voice synthesis, and video input (i.e., FLIR and LLLTV) processing. The three tactile input functions (ICS switch processing, ICS force stick processing, and HOTAS processing) are together known as DPICS.

Each of the information display subsystems uses ICS switch processing for control input and GRADS for display output. Additionally, a given display subsystem uses one or more of the other six driver functions for communicating with the crew. Figure 3-13 illustrates the composition of the AIDS software in terms of the levels discussed above. The vertical arrows through the levels indicate which lower levels are accessible from a higher level.

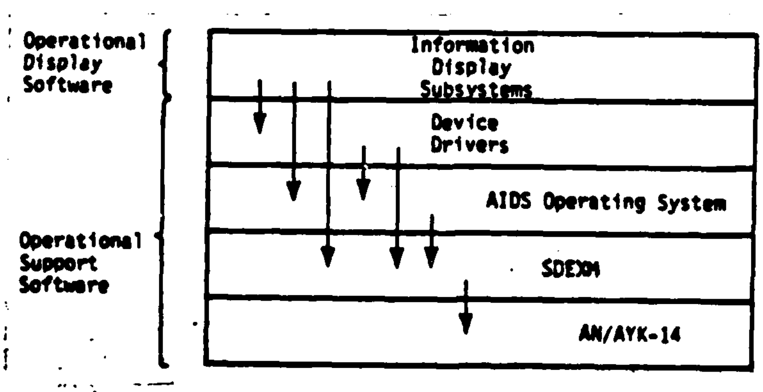

FIGURE 3-13 - AIDS Functional Partitioning

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To further explain the functional partitioning of the AIDS software, Tables 3-8 through 3-10 indicate the responsibilities and processing frequency of the AIDS functions. Table 3-8 indicates which AIDS functions are active in the various mission modes. Table 3-9 indicates which AIDS hardware modules are controlled by which AIDS function. Finally, Table 3-10 specifies the execution frequency of each AIDS function.

The following 19 subsections describe briefly the characteristics of each of the AIDS functions. The most general-purpose, commonly used functions are described first. Subsections 1 through 6 describe the AIDS Operating System functions, 7 through 9 describe the DPICS functions, 10 through 14 describe the other driver functions, and 15 through 19 describe the display subsystems.

3.3.5.1 Input/Output

The I/O function of the OSS multiplexes all the input and output requests of the various application programs. These requests are multiplexed through the single input and output channel provided by the Mbus. The I/O function supports three forms of I/O: OUTPUT MESSAGE, INPUT SINGLE MESSAGE, and INPUT PERIODIC MESSAGES. Both the OUTPUT MESSAGE and INPUT SINGLE MESSAGE form are I/O with wait; that is, the requesting application process is suspended until the I/O operation has been completed. For an INPUT SINGLE MESSAGE request, I/O completion occurs on the arrival of the Mbus input message identified by the parameters in the request.

The INPUT PERIODIC MESSAGES request supports the input of data which is processed periodically by an applications process. Examples of such data are flight parameters from the Navigation subsystem and force stick values from MPICS. Once an INPUT PERIODIC MESSAGES request has been received, the OSS continues to accept the input message identified by the request until a corresponding STOP PERIODIC INPUT request is received. During the actual transmission of the periodic message into the requesting tasks's input buffer, the OSS blocks the requesting process from running. Further, the OSS increments a sequence counter in the input buffer following the completion of each input message transmission. Thus when an application process must ensure that multiple words in the input buffer arrived in the same message, the process must verify that the value of the sequence counter is the same before and after accessing the multiple words.

Figure 3-14 illustrates the processing flow of the four OSS I/O procedures. Figure 3-15 illustrates the processing of the I/O function in response to an input message arrival.

3.3.5.2 File System

The file system function of the OSS provides the application programs with file system interface to the mass memory system. The file system supports only those file types and file access techniques required by AIDS. These types are fixed-length files which are read and written in their entirety and a single variable-length file, the Log, which is written sequentially. The majority of the files are read-only; these files contain all the programs (i.e., data processor, microprocessor, and SADI programs) which constitute the AIDS.

TABLE 3-8. AIDS FUNCTION VERSUS MISSION MODE

Function	MISSION MODE								
	Pre-Flight	Taxi	Take-Off	Take-off Transition	Cruise	Search	Landing Transition	Landing	Post-Flight
Mbus I/O	X		X	X	X	X	X	X	X
File System	X		X	X	X	X	X	X	X
Performance Monitoring	X		X	X	X	X	X	X	X
System Initialization	X								
Reconfiguration	X		X	X	X	X	X	X	X
Overlay	X		X	X	X	X	X	X	X
Switch Processing	X	X	X	X	X	X	X	X	X
Force-Stick Processing	X	X	X	X	X	X	X	X	X
HOTAS Processing			X	X			X	X	
BIED Processing	X								
Voice Reconfiguration	X	X	X	X	X	X	X	X	X
GRADS	X	X	X	X	X	X	X	X	X
Voice Synthesis	X	X	X	X	X	X	X	X	X
Video Input					X	X			
Flight Data Display	X	X	X	X	X	X	X	X	X
Equipment Monitoring	X	X	X	X	X	X	X	X	X
Communications	X	X	X	X	X	X	X	X	X
ASW Display					X	X			
AEW Display					X	X			

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TABLE 3-9. AIDS FUNCTION EXECUTION FREQUENCY

Function	EXECUTION FREQUENCY				
	60Hz	20Hz	5Hz	.5Hz	Asynchronous
Mbus I/O					X
File System					X
Performance Monitoring					X
System Initialization					X
Reconfiguration	X	X	X	X	X
Overlay					X
Switch Processing					X
Force Stick Processing		X			
HOTAS Processing					X
BIED Processing					X
Voice Recognition					X
GRADS	X	X	X	X	X
Voice Synthesis					X
Video Input					X
Flight Data Display	X	X			
Equipment Monitoring			X		
Communications Data Display			X		
ASW Display				X	
AEW Display				X	

TABLE 3-10. ALLOCATION OF AIDS HARDWARE MODULES TO SOFTWARE FUNCTION

	HARDWARE MODULE															
Function	Mbus Controller	Mass Memory	ICS	Stick Discretes	Bied	Voice Recognition	HUD	HMD	HSD	VSD	SAD	TD	ADU	Voice Synthesis	FLIR	LLLTV
Mbus I/O	X															
File System		X														
Performance Monitoring																
System Initialization																
Reconfiguration																
Overlay																
Switch Processing			X													
Force Stick Processing			X													
HOTAS Processing				X												
BIED Processing					X											
Voice Recognition						X										
GRABS							X	X	X	X	X	X	X	X		
Voice Synthesis																
Video Input															X	X
Flight Data Display							X	X	X	X						
Equipment Monitoring											X					
Communication Data Display									X		X					
ASW Display												X	X			
AEW Display												X	X			

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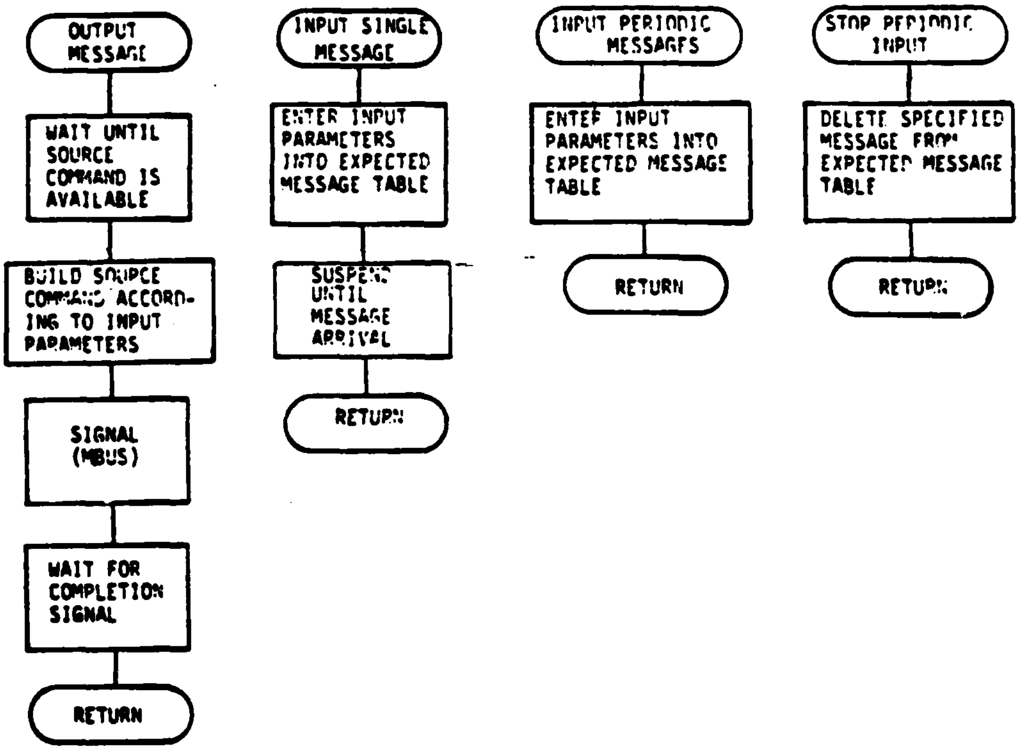

FIGURE 3-14 - I/O Request Processing

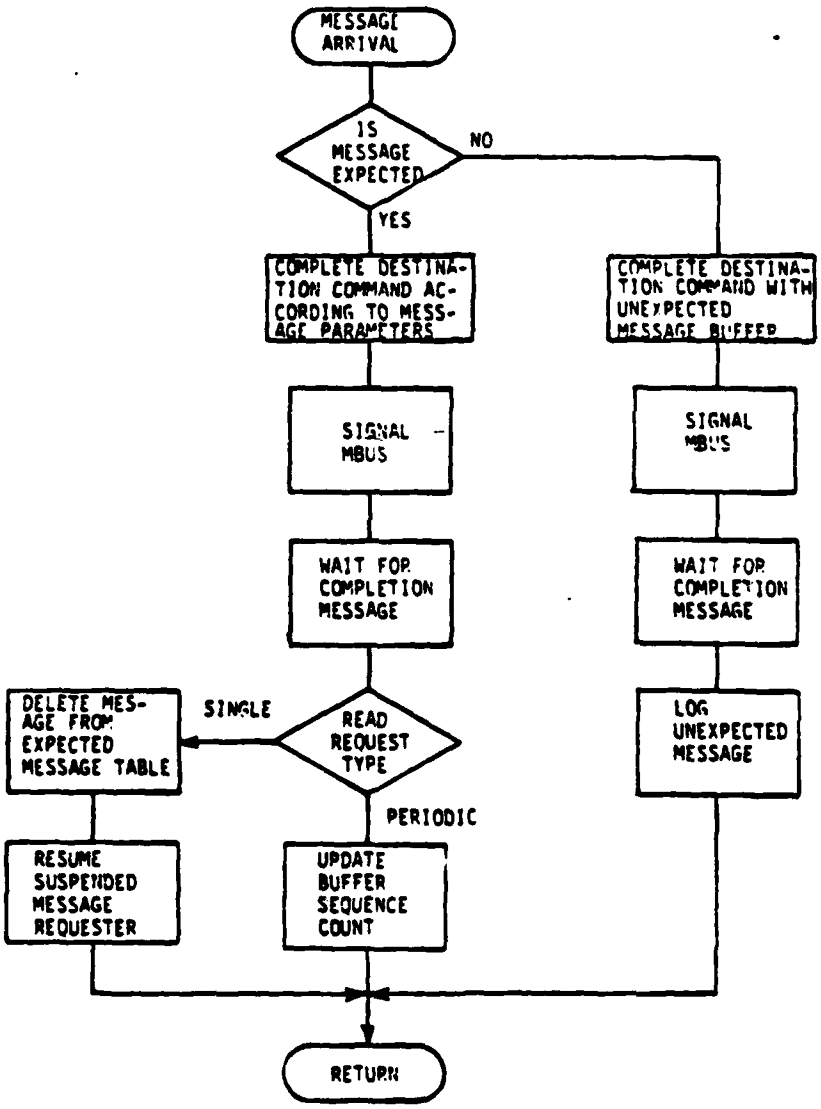

FIGURE 3-15 - Message Arrival Processing

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The read/write fixed-length files include the BIED mission data and the current system status. Finally, the Log contains all data collected and recorded during the mission. The allocation of these files on the mass memory is illustrated in Figure 3-16.

The file system provides four file access procedures: READ FILE, WRITE FILE, CREATE FILE, and LOG. Files accessed by READ FILE and WRITE FILE must have been allocated either at a system generation or dynamically via CREATE FILE. The OSS maintains a file directory which contains for each: the file's start address, its length, its access parameter (read-only or read/write), time of last access, type of last access (read or write) and identification of the process requesting the last access. In response to the READ FILE or WRITE FILE, the entire file is transferred.

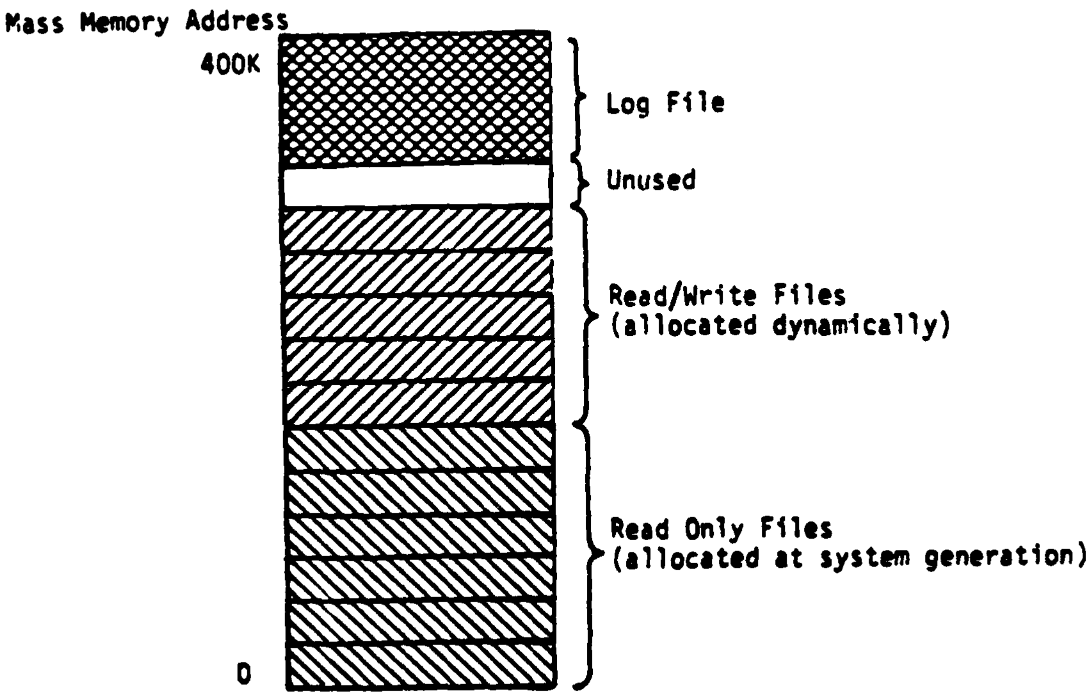

FIGURE 3-16 - Mass Memory File Allocation

Write access to the Log is provided by the LOG procedure. In response to a LOG request, the OSS appends the information to be logged at the end of the Log. As illustrated in Figure 3-16, the Log grows down from the top of the mass memory, while the dynamically allocated files are allocated up from the top of the statically allocated files. If the capacity of the mass memory is exceeded, all further CREATE FILE requests cause error notifications and further LOG requests overwrite the oldest entries in the Log.

Figure 3-17 illustrates the processing flow of the four file system procedures.

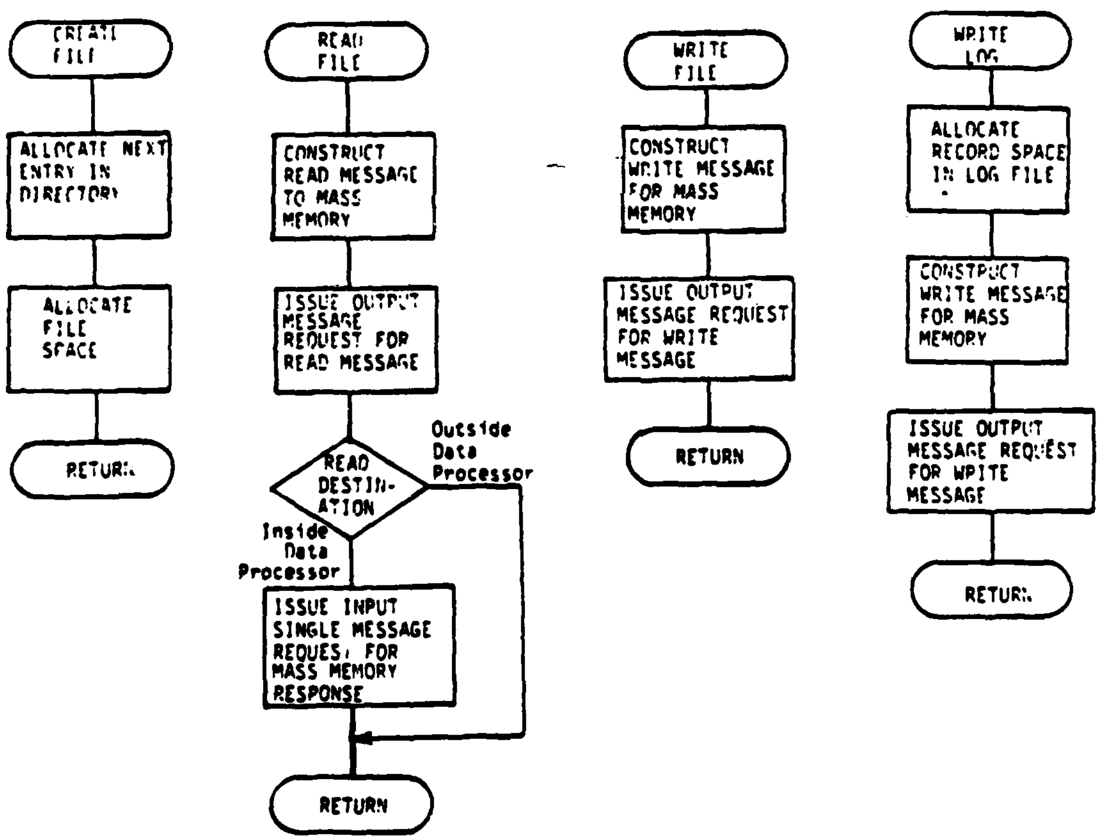

FIGURE 3-17 - I/O Procedure Processing

3.3.5.3 Performance Monitoring

The Performance Monitoring function of the OSS provides services intended to promote evaluation of the AIDS system performance, where performance refers to the throughput performance of the software and hardware, the performance of the crew when interacting with AIDS, and the performance of the software in response to both software and hardware failures. Effective performance monitoring requires active participation by all the AIDS software modules. By providing easy-to-use services, the Performance Monitoring function encourages this participation. The services provided are data recording, error notification, and software timing.

The data recording service allows an application program to supply data to be recorded and a code identifying the data. The data recording function will then time stamp the data, format the data into a standard data recording message, and log the message on the output device currently in use as the Log. During a mission, the Log will be the mass memory system; during system development and evaluation the Log could be an attached integration system or a line printer. Examples of data which will be recorded are software timing statistics, hardware and software failures, and crew response times. The generation of failure messages and timing statistics is explained below.

The Performance Monitoring function provides a centralized error reporting service to encourage detection and reporting of errors. This service allows an application program to report an error where the report includes a character string describing the error, a code describing the error severity, and a code describing the appropriate action. The severity code is either Warning, Caution, or Advisory. The action requested by the application program may be either to allow the program to continue execution or to terminate the program. Centralizing the error reporting facilitates modifying the standard error response as a function of the system's operating mode. That is, a different response is warranted during debugging, system evaluation, and fleet operation. Figure 3-18 illustrates the processing flow of the RECORD DATA and SIGNAL ERROR procedures.

The third service provided by Performance Monitoring is software execution timing. This service allows the application program to time any arbitrary sequence of program statements. The statistics gathered by the timing service include the number of times the sequence was executed and the average and maximum execution times for the sequence. By timing various sequences during system debugging and evaluation, the software may be optimized to increase system throughput. Further, the timing statistics may be used by human factors engineers during evaluation and fleet operations to analyze how the crew used AIDS. Figure 3-19 illustrates the processing flow through the four software timing performance monitoring procedures.

3.3.5.4 System Initialization

The System Initialization function of the OSS has the responsibility of initiating execution of the entire AIDS. This initiation may occur at the beginning of a mission ("cold-start"), during a mission after a power failure affecting the entire AIDS ("warm-start"), or during a mission after a power or

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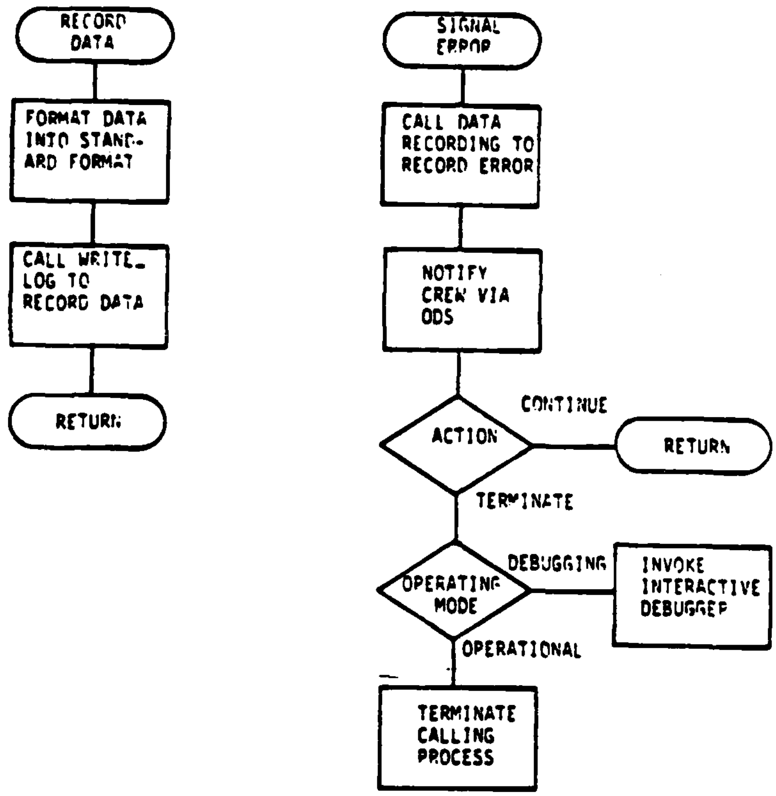

FIGURE 3-18 - RECORD_DATA and SIGNAL_ERROR processing

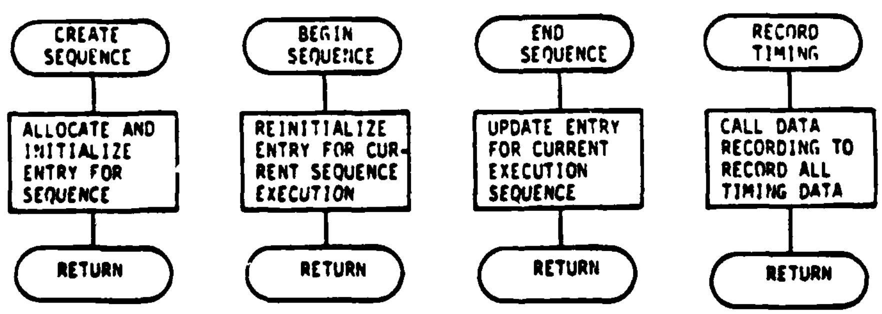

FIGURE 3-19 - Throughput Performance Monitoring Process

thermal failure affecting only an AN/AYK-14 ("AN/AYK-14 recovery"). In response to a warm-start or AN/AYK-14 recovery, System Initialization attempts to restore the AIDS to the configuration which existed before the failure. To do this, System Initialization uses the "System Status Table." The System Status Table at any point in time describes the current mission mode, the aircraft status, the status and allocation of all the AIDS modules, and any processing options selected by the crew. The table is updated by all the data processor programs. That is, whenever a program senses a change in the system status, it updates the table. It is the responsibility of the Reconfiguration process (see Section 3.3.5.5) to periodically copy the table to the mass memory. Thus, during a warm-start or AN/AYK-14 recovery, System Initialization restores the table by using the copy of the table in mass memory.

Initializing AIDS includes loading the volatile memories of all the AIDS hardware modules. The System Initialization function itself is loaded into the AN/AYK-14 by the Mbus controller.

Figure 3-20 illustrates the processing flow of System Initialization.

3.3.5.5 Reconfiguration

The Reconfiguration function is responsible for maximizing the information flow to the crew given the currently operational hardware. Reconfiguration performs this function by continuously monitoring the health of all the AIDS hardware and by reconfiguring the system in response to hardware failures. Reconfiguration is not one program; rather, failure monitoring and failure response for a given hardware module are performed by the particular program having the primary interface to the module. For example, the input/output function monitors the Mbus, the ODS monitors the displays, and DPICS monitors the ICP's. The reconfiguration performed by the various programs is coordinated through the System Status Table, which is updated by each program when it performs a reconfiguration action.

In addition to the reconfiguration procedures in the various programs, there is a central "Reconfiguration process" which is part of the OSS. This process in the OSS is the system's primary HOL process. The term "Reconfiguration function" refers to this process as well as to all the reconfiguration procedures in the various application programs. The Reconfiguration process is responsible for: (1) selecting the appropriate configuration of application programs in the AN/AYK-14, (2) exchanging status information with the Reconfiguration processes in the other MIDER, and (3) periodically copying the System Status Table into the System Status File.

Figure 3-21 illustrates the processing flow in the Reconfiguration process and the generic flow in a reconfiguration procedure.

3.3.5.6 Overlay

As discussed above, there will be several configurations of the AN/AYK-14 application programs. Configurations will vary as a function of mission mode and also as a function of operational hardware. For example, in the Preflight mode, programs are required for processing the checklists, whereas during the

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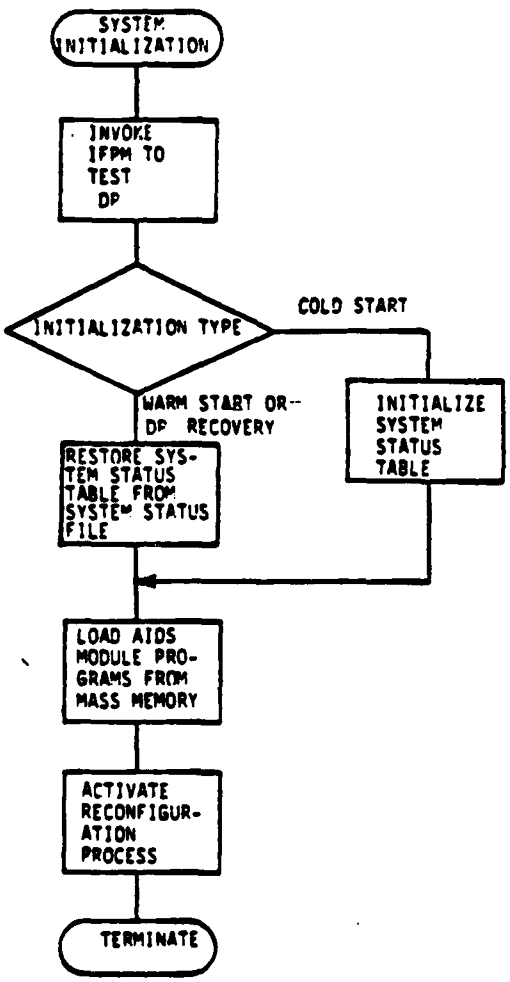

FIGURE 3-20 - System Initialization Processing

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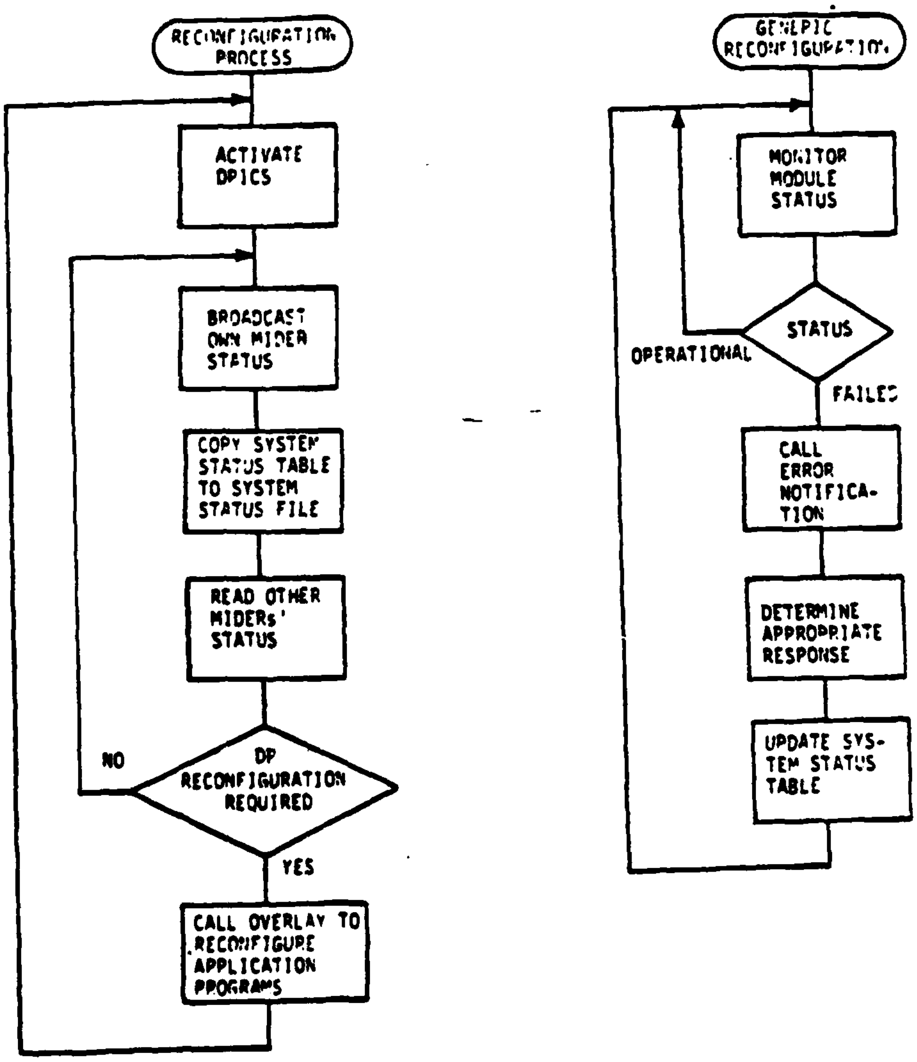

FIGURE 3-21 - Reconfiguration Processing

search mode these programs could be replaced with the ASW mission subsystem. In the AEW AIDS, when both data processors are operational, the information processing will be distributed between them, whereas when one of the data processors has failed, the remaining data processor must be reconfigured to perform only the most critical aspects of the information processing.

The Overlay function has the responsibility of loading a new configuration of application programs. The AN/AYK-14 program memory will be divided into two segments. One segment contains the OSS. This segment is loaded into the AN/AYK-14 by the Mbus controller and is never replaced. The other segment contains the variable configuration of application programs. For simplicity, the variable segment is replaced in toto by the Overlay function. Thus, the Overlay function supports only a single level overlay structure. The Overlay function is invoked by the Reconfiguration process, which supplies the name of the file containing the new configuration to be loaded.

Figure 3-22 illustrates the processing flow of the Overlay function.

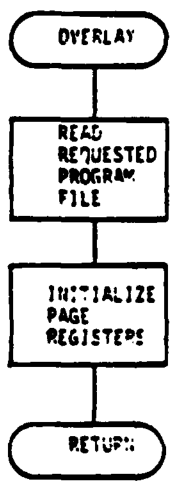

FIGURE 3-22 - Overlay Processing

3.3.5.7 Briefing Information Entry

The Briefing Information Entry function of the OSS is responsible for initializing both AIDS and the external avionics subsystems with data describing the mission to be performed in the current flight. This data includes map formats for the geographic areas to be flown over during the mission, supplemental tactical information corresponding to the maps, the primary and alternate flight plans, and preselected communication frequencies and codes.

The briefing information is contained on a cassette tape which is read by the Briefing Information Entry Device (BIED). This tape is prepared by the Mission Preparation System which formats the data on the tape into records which identify to the OSS the system which should receive the data. Data intended for AIDS is stored in files on the mass memory system. Data intended for one of the external avionic subsystems is transmitted over the Xbus to the subsystem. Figure 3-23 illustrates the processing flow of the Briefing Information Entry function.

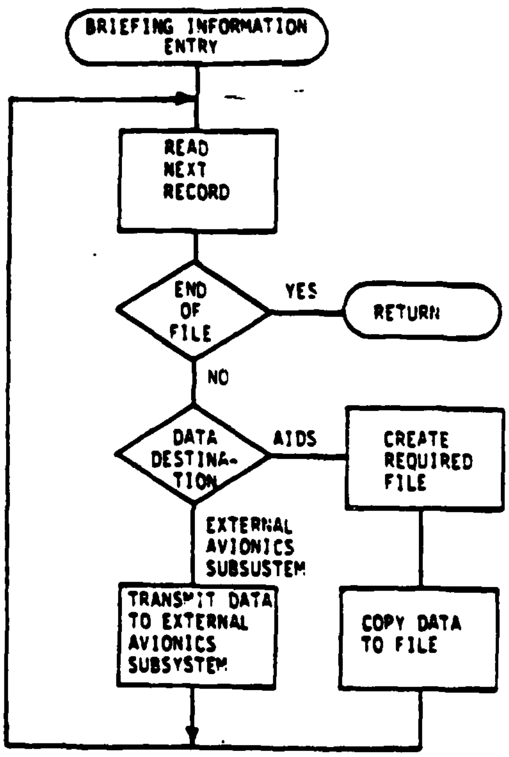

FIGURE 3-23 - Briefing Information Entry Processing

3.3.5.8 Switch Processing

The Switch Processing function within the AIDS configuration accepts MCP and ICP commands from the crew and routes these commands to the systems onboard the aircraft. Crew commands are input to the flight systems by a sequence of switch depressions through the Integrated Control Set (ICS) or through button depressions on the flight control stick acting in the Hands-On-Throttle-and-Stick (HOTAS) mode.

AIDS Switch Processing is partitioned into two functions: the Microprocessor Integrated Control Set (MPICS) firmware and the Data Processor Integrated Control Set (DPICS) software. The processing performed by these two functions is defined by the AIDS Command Language (ACOL). This language is used to specify the ICS programmable switch legends (via hierarchical switch sequences) and their interpretation by MPICS and DPICS. The ACOL switch specifications are translated by the AIDS Command Formatter (ACF) into two sets of tables. One is referenced by MPICS while the other is referenced by DPICS where both functions act as table-driven interpreters.

MPICS controls the backlighting of all switches, changing the legends of the programmable-legend switches, verifying the legality of each switch depression, processing numeric entries, reading the force stick, displaying the legends of depressed switches on the scratchpad display, and transmitting commands to DPICS. Commands do not necessarily correspond one-to-one with switch depressions; rather, a command is signaled by the completion of a sequence of switch depressions, where further interpretation requires DPICS processing.

DPICS accepts switch commands from MPICS and routes them to their intended destination. A command destination may be within AIDS (display control) or external to AIDS (external avionics subsystem control). An internal AIDS command is routed to the "command input queue" of the appropriate AIDS function. This queue is subsequently read by the AIDS function as part of its input processing. DPICS processing of an external AIDS switch command results in the output of a command message and value (via the OSS) to the designated external avionics system.

DPICS processing consists of three functions: switch processing, force stick processing (reference Section 3.3.5.9), and HOTAS processing (reference Section 3.3.5.10). The latter two functions represent specific processing responses to force stick and HOTAS selections.

Figure 3-24 illustrates the Switch Processing function.

3.3.5.9 Force Stick Processing

The Force Stick function is activated by the Switch Processing function upon receipt of a switch command specifying a force stick input requirement. Once activated, the Force Stick function accepts periodic readings (via an INPUT PERIODIC MESSAGE I/O request) from the ICS force stick and routes these readings to the destination system specified by the Switch Processing function.

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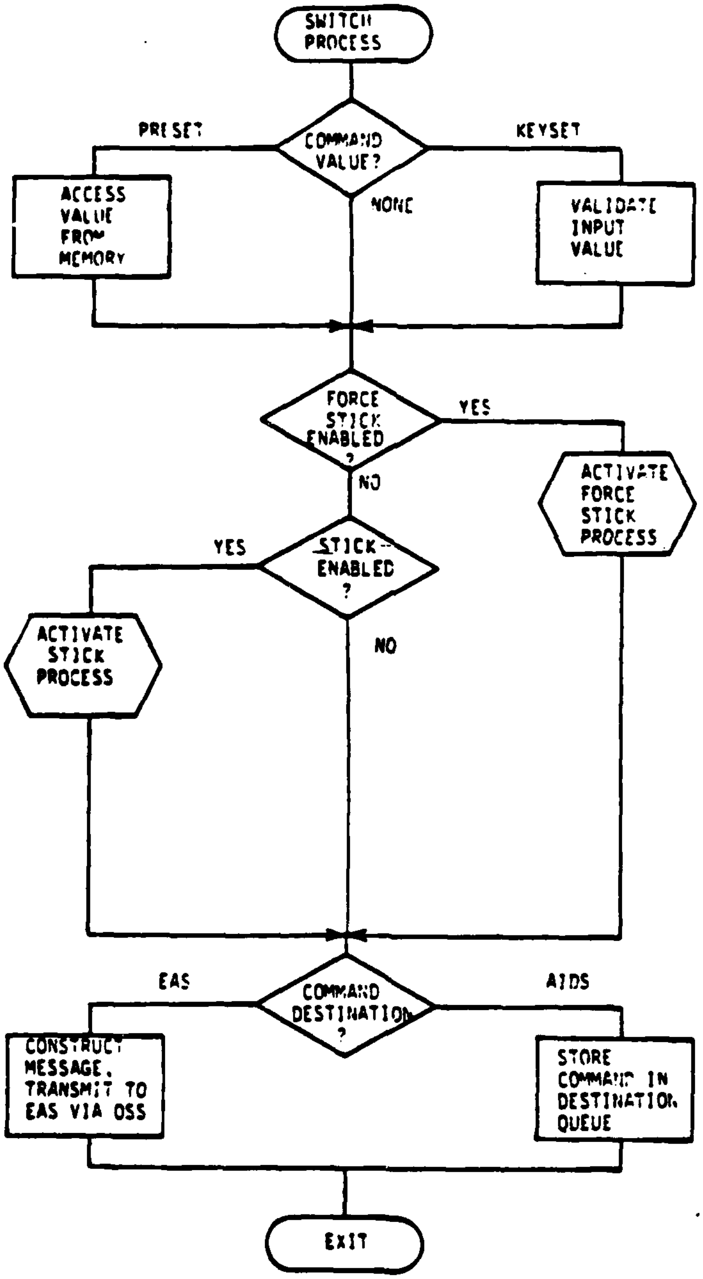

FIGURE 3-24 - Switch Processing

In addition to specifying the destination system, Switch Processing shall also specify the associated transformation function which defines how to transform the raw force stick values into destination-specific values. Each transformation function is a piecewise linear function with at most five discrete linear segments. Specific interpretations of the "transformed" force stick values include, for example, radio volume and radio tuning frequency.

The Force Stick function remains active until terminated by Switch Processing in response to a terminate force stick switch command. Figure 3-25 illustrates the Force Stick function's processing.

3.3.5.10 HOTAS Processing

The Hand-on-Throttle-and-Stick (HOTAS) Processing function is responsible for accepting, interpreting, and routing pilot commands arising from pilot selection of the buttons on the throttle and the flight control stick. These commands allow pilot selection of communication channels and frequency and also provide limited menu-oriented interaction with AIDS. When HOTAS interaction is enabled, AIDS displays a menu on a SAD, and via stick button depressions the pilot selects desired menu items. HOTAS command interpretation and routing are performed using the same conventions described previously for Switch Processing.

3.3.5.11 Voice Recognition

The AIDS Voice Recognition function accepts, interprets, and routes commands input through the voice recognizer. The voice recognizer is, at any point in the mission, configured to recognize a fixed set of phrases from a specific crewmember. In response to mission mode changes, Voice Recognition requests the mass memory to transmit to the voice recognizer the voice library appropriate to the selected mission mode. Thus, for the takeoff and landing modes, the pilot's voice library would be transmitted, whereas for the search mode either the TACCO's or CICO's voice library would be transmitted. The command inputs received from the voice recognizer are coordinated with ICP- and HOTAS-generated commands and are processed using the conventions described above for ICP Switch Processing.

3.3.5.12 Graphics Support

The Graphics Support function of the OSS is responsible for displaying information on the AIDS displays. In response to function calls, Graphics Support initializes the processing of a particular format on a particular Symbol Generator (SG) and subsequently makes changes in what is displayed within initialized formats. An SG is either an RSG, the HUD's stroke symbol generator, or a SAD symbol generator. If graphics devices or symbol generators malfunction, the Graphics Support is responsible for passing this information to the currently loaded ODS programs. A large group of Graphics Support procedures, generically called "put-procedures," will be described as a unit in what follows. The other Graphics Support procedures, namely CONFIGURE SG, ASSIGN FORMAT TO SG, UPDATE FORMAT, and STOP SG will be described individually.

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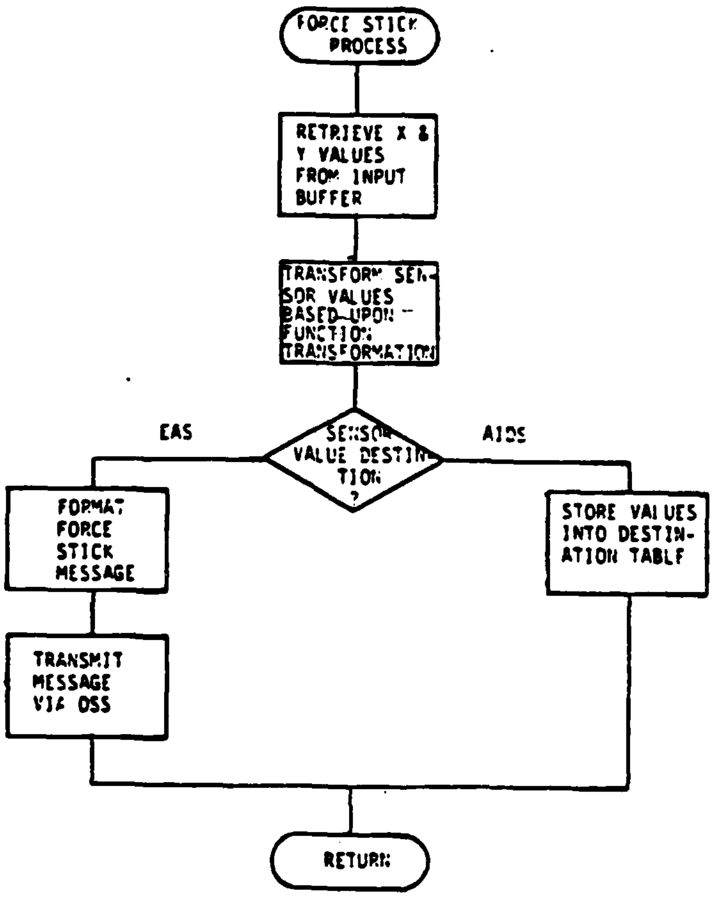

FIGURE 3-25 - Force Stick Processing

The ODS calls CONFIGURE SG to initialize the device-dependent processing parameters of a symbol generator. These parameters include frame-rate, Vbus output channel number, and aspect ratio.

ASSIGN FORMAT TO SG causes a particular format to be prepared for display on one of the symbol generators. The SADI program for the format is transmitted from the mass memory to the microprocessor for the SG. Internal AIDS software data structures are also initialized. This initialization includes retrieving format-specific display change commands from the mass memory.

The Put Procedures are used by the ODS software to change a format. Formats are created prior to mission time by the action of the GRADS Picture Compiler (Michener 80). The GRADS Picture Compiler compiles a high-level picture specification into SADI instructions. The picture specification describes both the visible symbology of the format and the ways in which this symbology may change. Each aspect of a format which may change is identified uniquely by a "rapid change" name. Put Procedures are the means by which the ODS makes specific changes to the visible symbology of a format. There are Put Procedures to change the following aspects of a format, the terminology is defined in (Michener 80):

- X coordinate or Y coordinate of any position (PUT COORD).
- X coordinate and Y coordinate of any position (PUT PT).
- Visibility of part of a format (PUT ATVAL).
- Blinking of part of a format (PUT ATVAL).
- Intensity of part of a format (PUT ATVAL).
- Translation, rotation, or scaling of part of a format (PUT PT, PUT ANGLE, PUT SCALE).
- Characters in or length of a text string (PUT CHARS, PUT TEXTLENGTH).
- Radius of a circle (PUT COORD).
- Display-specific parameters of a format (e.g., PUT SKYGROUND).

Format changes specified by calls to Put Procedures do not result immediately in visible changes to the displayed symbology because these format changes are buffered by the graphics support. After an ASSIGN FORMAT TO SG invocation, the calling ODS program would typically call Put Procedures so that the very first display of the newly loaded format is in accord with current aircraft or mission status.

UPDATE FORMAT is a signal from the ODS programs to the Graphics Support that it is time for the accumulated changes for a given format to be sent to the SG.

The UPDATE FORMAT call also starts an SG processing its newly loaded format. For example, the ODS program controlling a format which changes at 20 Hz would, every 20th of a second, call various Put Procedures and then call UPDATE FORMAT to send all the changes to the SG for the format. If, in addition, parts of the format change only at 5 Hz, then every fourth time the ODS program executes, it would call Put Procedures for those parts of the format.

STOP SG causes a symbol generator to cease processing its current format and to remove visible information previously generated for that format from any displays on which it appears. Thus, an RSG would be told both to cease processing the format and to cease transmitting the raster output buffer over the Vbus to the AIDS displays.

Figures 3-26 and 3-27 illustrate the functional processing of the Graphics Support procedures.

3.3.5.13 Voice Synthesis

The AIDS Voice Synthesis function receives requests from any of the application functions to output one of a predefined set of voice messages. In response, Voice Synthesis formats and outputs these requests to the voice synthesizer. Voice Synthesis is also responsible for setting the voice characteristic parameters of the voice synthesizer.

3.3.5.14 Video Input

The AIDS Video Input function is responsible for communication with the V/STOL video sensors, assigning Vbus channels to these sensors; assigning synchronization signals to these sensors, if required, and routing the video input to the appropriate RSG for mixing with AIDS-generated symbology. All of the above functions are performed in response to requests for video input from the application programs.

3.3.5.15 Flight Data Display

The Flight Data Display function is responsible for performing all processing associated with flight symbology display. The processing includes input data conversion and verification, sensor failure/recovery, and symbol activation and positioning. Input sources are NAV/JTIDS, DPICS, and the Helmet Position Sensor. The Flight Data Display function controls the display of symbology on the HUD, HMD, VSD, and HSD.

Flight Data Display periodically samples the flight parameter buffers input from NAV and JTIDS. The maintenance of these buffers is performed by the OSS. Those flight parameters which have changed since a previous update period are verified against their legal value ranges. A parameter failing the verification process has its associated sensor status indicator reclassified as "failed"; an alternative sensor will be activated if such a backup currently exists.

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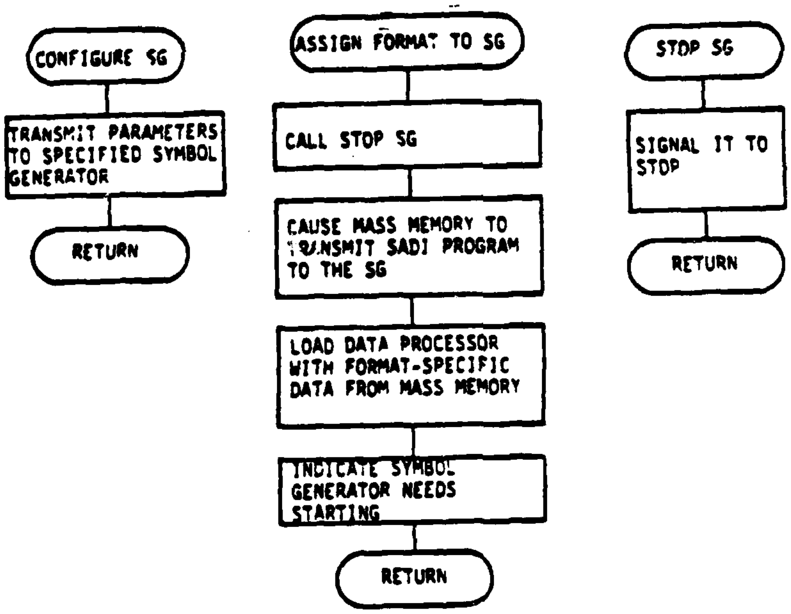

FIGURE 3-26 - Symbol Generator Control Processing

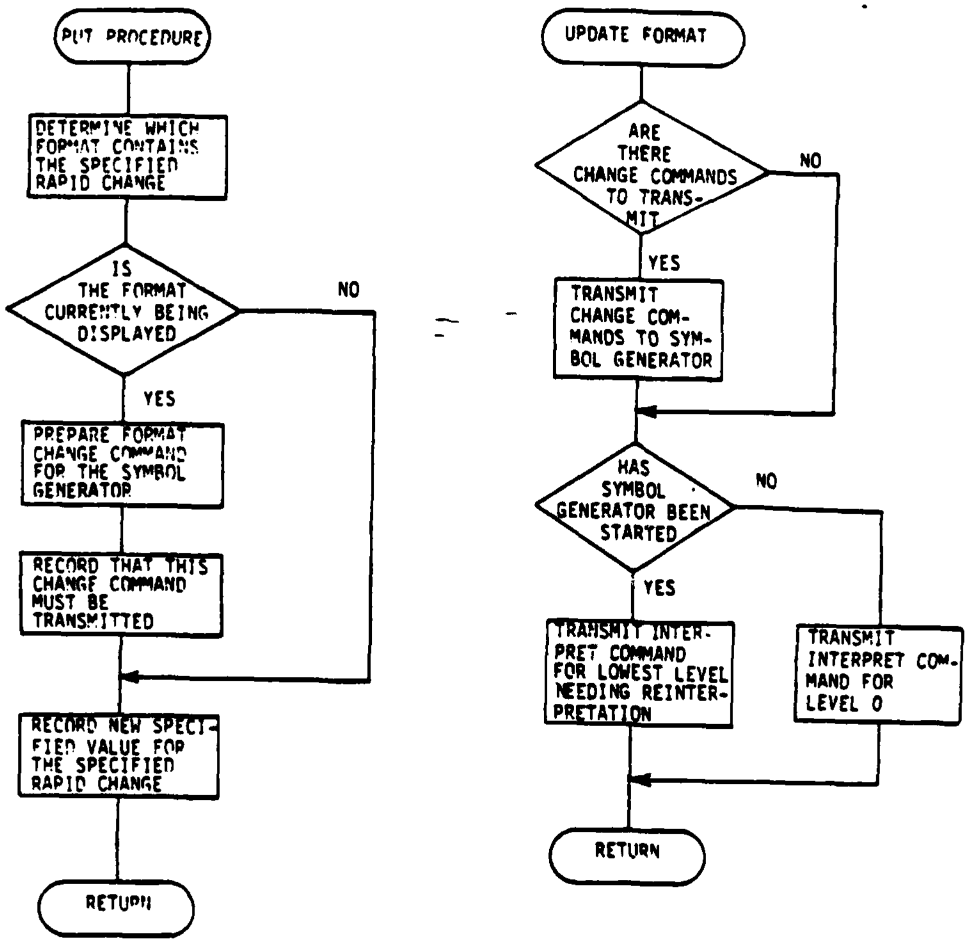

FIGURE 3-27 - Format Update Processing

Display update processing is performed by the Flight Data Display function by examining display format and status change indicators within the flight display data base. Display processing includes format changes in response to mission mode changes, changes in symbol visibility and presentation (e.g., change in display format, map position, or device destination), and changes in display device's status (active/inactive). Update processing of any individual display is dependent upon the current format. For example, symbol visibility processing is not required if a symbol is currently not "active." Specific display formats are presented in Section 3.4.15.

Figure 3-28 illustrates the Flight Data function's processing. This processing is performed at both 60 Hz and 20 Hz for different flight parameters.

3.3.5.16 Equipment Monitoring

The Equipment Monitoring function is responsible for providing the crewmembers with system status information. This information is displayed on the AIDS SAD. The status information is displayed in either a checklist or a system monitoring mode. Equipment Monitoring includes conversion of periodic sensor samples to internal AIDS representations, modification of the advisory display presentations, and crewmember notification (via the SAD) of sensor failure occurrences. Periodic sensor samples and asynchronous failure notifications are input to this function from the ULAIDS and IEIS while asynchronous display control commands are input from DPICS.

The ULAIDS and IEIS transmit periodically to Equipment Monitoring those sensor parameters currently being presented on the SADs. Equipment Monitoring converts the sensor value contents to their internal AIDS representations and subsequently uses these converted values to update the appropriate sensor value fields on the SADs. This periodic process continues until a new format representation is to be presented on a SAD in response to a DPICS format change command.

In response to a sensor failure occurrence, the ULAIDS and IEIS transmit asynchronously to the Equipment Monitoring function a failure notification defining the particular sensor and its present value. In response, Equipment Monitoring places the corresponding failure message into a failure queue. All failure messages are placed in this queue; after the currently displayed failure message is explicitly acknowledged by the crewmember, the oldest failure message is removed from the queue and displayed.

Processing of DPICS inputs will be dependent upon the type of format currently being presented on the SAD. For checklist formats, DPICS input responses consist of page advancement, cursor advancement, and prompt inputs. The system monitoring formats are hierarchically structured where higher-level formats contain summary status information and lower-level formats contain detailed information. DPICS input commands allow for selection of any level presentation. For either format presentation, DPICS inputs responses allow for failure message acknowledgement. This acknowledgement response results in the presentation of the appropriate sensor failure information as well as the display of the next failure message, if one exists.

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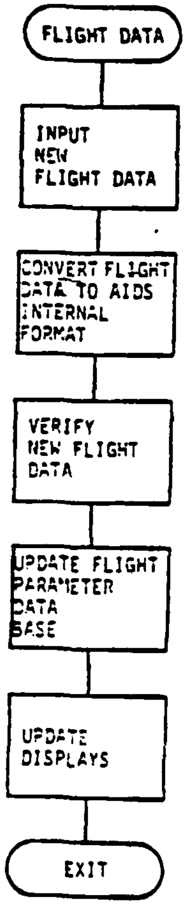

FIGURE 3-28 - Flight Data Processing

Figure 3-29 illustrates Equipment Monitoring processing. This processing is performed at a 5-Hz rate as well as asynchronously in response to a sensor failure.

3.3.5.17 Communications Data Display

The Communications Data Display function is responsible for providing the pilot with communication equipment information. This information is displayed on the AIDS SADs. The inputs to this function are provided by the COMM external avionics subsystem.

3.3.5.18 ASW Display

The AIDS ASW Display function is responsible for the three displays (TD, ADU and SAD) at the two ASW mission officer stations (TACCO and SENSO). On the TD, the ASW Display function displays a geographic format indicating sonobuoys, targets, and waypoints. On the ADU the ASW Display function displays formatted acoustic data. The ASW Display function commands the signal processor to format the acoustic data according to the mission officer selected format. On the SAD, the ASW Display function presents an alphanumeric annotation of both the current TD and ADU formats.

3.3.5.19 AEW Display

The AIDS AEW Display function is responsible for the two displays (TD and SAD) at each of the three AEW mission officer stations (CICO, ACO1, and ACO2). On the TD, the AEW Display function displays a geographic format illustrating the tactical environment. On the SAD, the AEW Display function displays an alphanumeric annotation of the TD's tactical environment format.

3.4 *DETAILED FUNCTIONAL REQUIREMENTS*

This section contains the detailed requirements of the 19 AIDS software functions described above. Each function is specified in terms of its inputs, processing, outputs, and special requirements. For all of the functions, several special requirements for debugging and testing apply. These special requirements are specified below.

Each function shall optionally verify and record all of its inputs. Each function shall include timing information in its data recording output. Also, each function shall utilize the performance monitoring facilities of the OSS. Performance monitoring information shall be used to optimize execution performance of the AIDS.

It shall be possible to exclude from a function the code required for data verification, data recording, and performance monitoring. It shall also be possible to enable and disable execution of this code.

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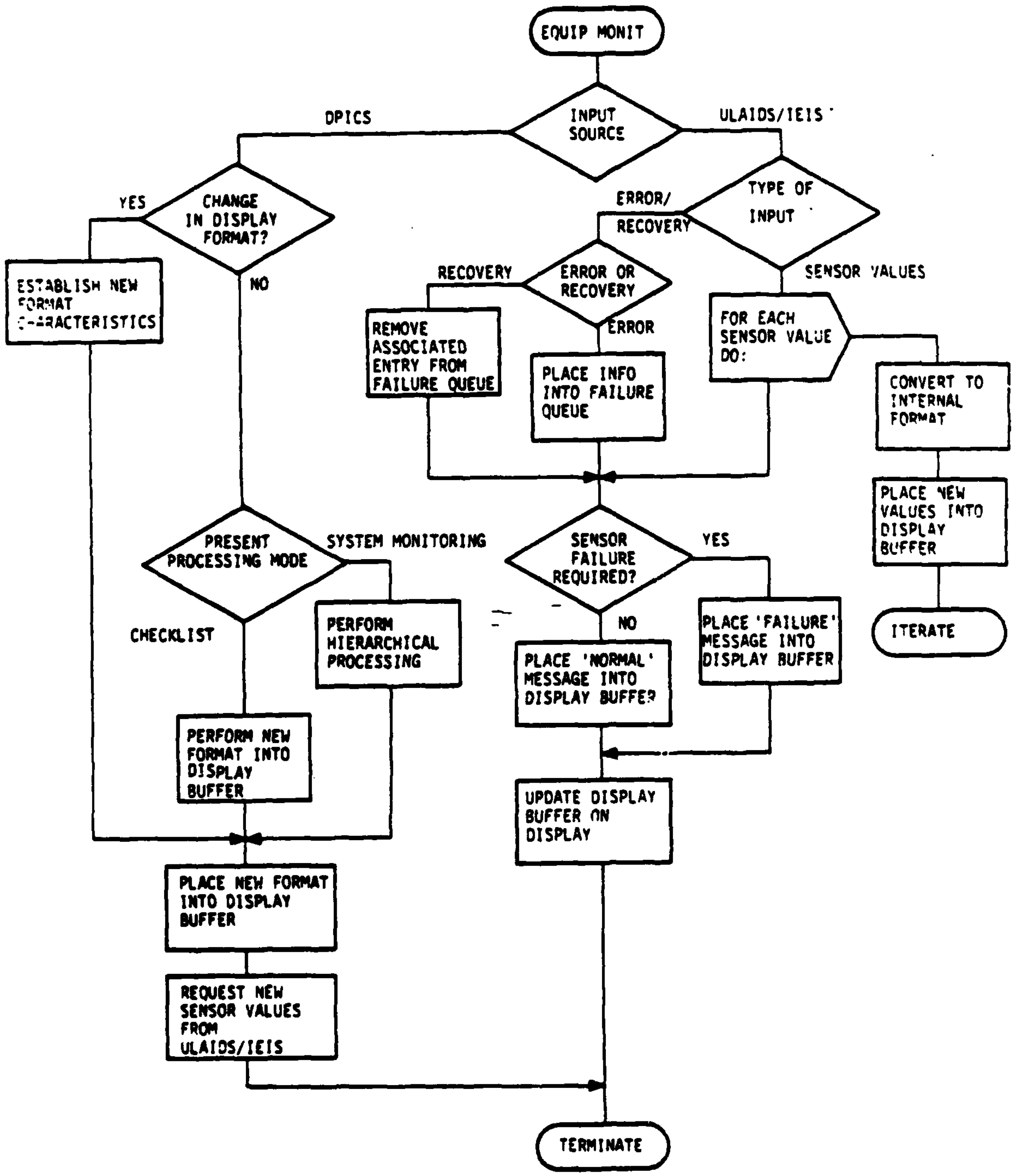

FIGURE 3-29 - Equipment Monitoring Processing

When a function diagnoses either a hardware error for which no corrective action is possible or any software error, the function shall utilize the OSS signal-error mechanism. After signaling the error, the function shall either attempt recovery action or terminate.

In addition to these special requirements, which are applicable to all the AIDS functions, several of the AIDS functions have a requirement to perform hardware failure monitoring and recovery. Each function which is responsible for controlling a given hardware module is also responsible for the Reconfiguration processing associated with that module. This Reconfiguration processing is not discussed in the processing subsection for each function. Instead, the discussion of the Reconfiguration processing for all the functions is centralized in Section 3.4.5.2, "Reconfiguration Processing."

The 19 functions are described in this section according to the order used in Section 3.3.5. In the description of each function's inputs and outputs, the following conventions are used. If inputs or outputs are supplied as procedure call parameters, they are identified as in the following example of inputs to the Mbus I/O function:

STOP PERIODIC INPUT Parameters
    Source Identification
    Message Code

Alternatively, if the inputs are supplied as a table in memory, they are identified as in the following example illustrating the destination command table supplied to OSS by the Mbus controller:

Destination Command Fields
    Source Identification
    Message Code
    Number of Words

3.4.1 Input/Output (I/O) Requirements

The I/O function of the OSS is responsible for translating application program requests for input and output into commands conforming to the Mbus protocol. The Mbus protocol is described briefly in Section 3.3.1.2 of this specification and in detail in the "AIDS System Specification for Advanced Development Model" (GE79a).

3.4.1.1 I/O Inputs

Input	Source	Frequency
OUTPUT MESSAGE Parameters Buffer Address Number of Words Destination Identification Message Code Priority Indication	Application Program	Aperiodic

Input	Source	Frequency
INPUT SINGLE MESSAGE Parameters Buffer Address Number of Words Source Identification Message Code	Application Program	Aperiodic
INPUT PERIODIC MESSAGES Parameters: Buffer Address Number of Words Source Identification Message Code	Application Program	Aperiodic
STOP PERIODIC INPUT Parameters Source Identification Message Code	Application Program	Aperiodic
Source Command Resource	SDEX/M	Aperiodic
Synchronization Signal	Mbus (via SDEX/M)	Aperiodic
Signal Code Values Source-Command-Read Source-Buffer-Emptied Destination-Command-Written Destination-Buffer-Filled Completion Identifier	Mbus	
Destination Command Fields Source Identification Message Code Number of Words		

3.4.1.2 I/O Processing

For output operations, the OSS I/O processing begins with an application program OUTPUT MESSAGE request. In response, the OSS shall transfer the request parameters (buffer address, number of words, destination identification, message code, and priority indication) into the source command. However, because multiple processes will be using the source command, the OSS shall first request write access to the source command. Access shall be controlled via an HOL resource variable. After completing the source command, the OSS shall initiate the write operation by issuing an interrupt to the Mbus. The interrupt shall be emitted via the AN/AYK-14's Discrete Interface Module programmable interrupt facility. The Discrete Interface Module I/O program shall be initiated using the SDEX/M Executive I/O Command ESR. The OSS shall identify the synchronization signal as the source command ready signal by storing the value "1" into the source command ready word. After initiating this I/O Program, the OSS shall wait for the responding synchronization signal from the Mbus.

When the Mbus has read the source command, it interrupts the data processor using the Discrete Interface Module. Upon receiving the interrupt, the OSS shall read the Mbus interrupt code ring buffer to determine to which Mbus signal the interrupt corresponds.

If the signal was for source-command-read, the signal is in response to the source-command-written signal generated by the data processor. (The processing for the three other possible signal codes is discussed below.) In response to the source-command-read signal, the OSS shall release the source command resource and then await a signal from the Mbus that the message transmission has been completed. When this signal occurs, the OSS returns control to the application program.

For input operations, OSS I/O processing begins with receipt from the Mbus of the destination-command-written signal. In response, the OSS shall determine the input buffer which corresponds to the message source and code. This correspondence is determined by searching the table which contains the outstanding input message requests from application programs. Entries are stored in this table in response to both INPUT SINGLE MESSAGE and INPUT PERIODIC MESSAGES requests. If an entry is not found for the particular source and code, the OSS shall signal an error and shall accept the input in its own buffer space. (After receiving the input, the OSS shall then use the data recording facility to log the contents of the unexpected input message.)

Assuming the message is expected, the OSS shall store the corresponding input buffer address and completion identifier into the destination command. The OSS shall then signal the Mbus using the Discrete Interface Module. The OSS shall identify the interrupt as the destination-command-ready signal by storing the value "1" into the destination command ready word.

When the Mbus signals completion of the message input, the OSS response depends on the corresponding input message request. If the request was INPUT SINGLE MESSAGE, the OSS shall return to the application program with the number of words as an output parameter. If the request was INPUT PERIODIC MESSAGES, the OSS shall increment the message sequence counter and store the number of words input. The counter and number of words will, by convention, be the first two words in the input buffers. The OSS shall request the Mbus to store the input message beginning two words beyond the beginning of the application-program-supplied address.

As inferred above, the OSS must receive an input message request prior to the arrival of the corresponding input message. Both the INPUT SINGLE MESSAGE and INPUT PERIODIC MESSAGES requests include as parameters the message source and code, the input buffer address, and maximum number of words. When the corresponding message arrives, if its length is greater than the application-program-specified maximum, the OSS shall treat the message as an unexpected message.

After the message corresponding to INPUT SINGLE MESSAGE request has been received, the OSS shall remove the message request from the unexpected message table before returning to the requester.

3.4.1.3 I/O Outputs

Output	Destination	Frequency
Synchronization Signal	Mbus (via SDEX/M)	Aperiodic
Signal Code Values Source-Command-Written Destination-Command-Completed	Mbus	
Source Command Fields Destination Identification Message Code Priority Indication Buffer Address Number of Words Source Identification Completion Identifier	Mbus	Aperiodic
Destination Command Fields Buffer Address Completion Identifier	Mbus	Aperiodic
Source Command Resource	SDEX/M	Aperiodic
Input Sequence Number	Application Program	Aperiodic
Number of Words	Application Program	Aperiodic

3.4.1.4 I/O Special Requirements

1. The source command, the destination command, and the signal identification queue shall be allocated at virtual locations, TBD, TBD, and TBD, respectively in the data processor's memory.

2. All input and output buffers shall be allocated within the first 16K words of the data processor's virtual memory.

3. The data processor shall respond to the destination-command-written signal within 1 msec.

4. The I/O function shall be reentrant.

3.4.2 File System Requirements

The File System function of the OSS is responsible for translating application program requests to create, write, and read files into requests conforming to the mass memory system interface. The File System function is also responsible for monitoring the health of the mass memory system and utilizing an

alternate mass memory system in response to mass memory failure. The AIDS mass memory system is described briefly in Section 3.3.1.6 and in detail in the "Mass Memory System Advanced Development Description" (GE 79a).

3.4.2.1 File System Inputs

Input	Source	Frequency
CREATE FILE Parameters File Length	Application Program	Aperiodic
WRITE FILE Parameters File Name Buffer Address Buffer Length Destination Identification	Application Program	Aperiodic
READ FILE Parameters File Name Buffer Address Buffer Length Destination Identification	Application Program	Aperiodic
LOG Parameters Buffer Address Buffer Length	Application Program	Aperiodic
File Directory	System Generation (via Mass Memory)	Aperiodic

3.4.2.2 File System Processing

File System processing may be described in terms of its response to the four file access requests. In response to a CREATE FILE request, the OSS shall: (1) allocate the next available entry in the file directory; (2) enter into this entry the file's length as specified in the request; (3) allocate the requested number of words from the unused area of mass memory; and (4) return as an output parameter the index of the allocated file directory entry.

For a WRITE FILE request, the OSS shall issue a write request to the mass memory system using the data addressed by the buffer address parameter in the WRITE FILE request and using as the mass memory starting address the value contained in the directory entry for the input file name. The file processing function shall return to the user after completion of the write operation.

For a READ FILE request, the OSS shall issue a read request to the mass memory system where the mass memory words to be read are those specified in the file directory entry selected by the input file name. If the destination identification is the data processor itself, the file data is read into the memory identified by the input buffer address. (If the file length is greater than the input buffer length, the OSS shall signal an error.) If the destination

address is not the data processor, the OSS shall request the mass memory to transmit the file contents to the specified destination. In either case, the OSS shall return to the requester after the file contents have arrived at the specified destination.

On a LOG request, the OSS shall issue a request to the mass memory to write the data specified in the LOG request. The data shall be written in mass memory at the end of the LOG file. The OSS shall return to the user after completion of write request.

3.4.2.3 File System Outputs

Output	Destination	Frequency
Mass Memory Write Parameters TBD	Mass Memory (via Input/ Output Function)	Aperiodic
Mass Memory Read Parameters TBD	Mass Memory (via Input/ Output Function)	Aperiodic
File Contents	Application Program and Mass Memory System	Aperiodic

3.4.2.4 File System Special Requirements

None.

3.4.3 Performance Monitoring Requirements

The Performance Monitoring function of the OSS has the dual role of: (1) monitoring the performance of the AIDS software in terms of its execution speed, and (2) providing general-purpose data recording and error notification services. The Performance Monitoring function does not monitor the status of the AIDS hardware; this function is performed by the Reconfiguration function. However, the Performance Monitoring data recording and error notification services are used by the Reconfiguration function to both record hardware failures and notify the crew of hardware failures.

3.4.3.1 Performance Monitoring Inputs

Input	Source	Frequency
RECORD DATA Parameters: Buffer Address, Buffer Length	Application Program	Aperiodic
SIGNAL ERROR Parameters: Error Message, Error Code: Warning, Caution, or Advisory Action	Application Program	Aperiodic

Input	Source	Frequency
TIMING SEQUENCE Parameters Timing Identifier	Application Program	Aperiodic
BEGIN TIMING Parameters Timing Identifier	Application Program	Aperiodic
END TIMING Parameters Timing Identifier	Application Program	Aperiodic
RECORD TIMING	Application Program	Aperiodic

3.4.3.2 Performance Monitoring Processing

In response to a RECORD DATA request, the OSS shall construct a data recording message conforming to the interface specification between the AIDS OSS and the AIDS Data Reduction Systems. This specification requires each message to contain time of generation, identification of the message originator, the message type, the length of the message, and the message itself. After constructing the message, the OSS shall log the message using the LOG procedure of the File System.

In response to a SIGNAL ERROR request, the OSS shall respond according to the system execution mode and the action requested by the user. The action parameter may be either terminate or continue processing. The execution mode may be either operational or debugging. In all cases, the error message shall be displayed to the appropriate crewmember according to the error code (Warning, Caution, or Advisory). Additionally, the error occurrence shall be logged using the RECORD DATA function. If the requested action is continue processing, the OSS shall return to the user, regardless of the system execution mode. If the requested action is terminate processing and the execution mode is operational, the OSS shall terminate the process issuing the request. Finally, if the requested action is terminate processing and the execution mode is debugging, the OSS shall invoke the debugger to allow the programmer to investigate the error condition.

In response to a TIMING SEQUENCE request, the OSS shall allocate and initialize an entry in its timing table. Henceforth, the references to the timing sequence identified by the timing identifier input parameter shall refer to this entry. In response to a BEGIN TIMING request, the OSS shall begin accumulating the amount of CPU time spent executing the process which issued the BEGIN TIMING request. This accumulation shall continue until an END TIMING request with the same timing identifier is received by the OSS. At this time, the OSS shall update the entry associated with the timing identifier. The updated entry will contain the number of times the sequence has been timed, and the maximum time and average time spent executing the sequence. Finally, in response to a RECORD TIMING request, the OSS shall call the RECORD DATA function to log the entire timing table.

3.4.3.3 Performance Monitoring Outputs

Output	Destination	Frequency
Error Messages	Pilot (via ODS)	Aperiodic
Data Log Messages Application Program Data Error Data Timing Data	Log (via File System)	Aperiodic

3.4.4 System Initialization Requirements

The System Initialization function of the OSS is responsible for initiating the execution of first the AIDS data processor and then the entire AIDS. Initiation occurs in one of three modes: cold-start, warm-start, and AN/AYK-14 recovery.

3.4.4.1 System Initialization Inputs

Input	Source	Frequency
AN/AYK-14 Program Load	Mass Memory (via Mbus Controller)	Once
Initialization Code Values		
Cold-Start	Mbus Controller	Once
Warm-Start	Mbus Controller	
AN/AYK-14 Recovery	OSS Reconfiguration	
AN/AYK-14 Hardware Status	In-Flight Performance Monitoring (IFPM)	Once
System Status Table	Mass Memory	Once

3.4.4.2 System Initialization Processing

The data processor execution will be initiated either by the Mbus controller or by the AN/AYK-14 restart logic. Initiation by the Mbus controller will occur either after the pilot first applies power to the AIDS (cold-start) or after the recovery from power failure recognized by the Mbus (warm-start). Initiation by the AN/AYK-14 restart logic will occur following a power or thermal failure which affected only the AN/AYK-14 (AN/AYK-14 recovery). The data processor shall determine the initiation source by interrogating the initiation code stored in the AN/AYK-14 memory in response to the AN/AYK-14 power or thermal tolerance interrupt. The Mbus controller will have stored either the cold-start or warm-start code in the word if it is responsible for AN/AYK-14 execution initiation.

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Following initiation, the OSS shall invoke the IFPM procedure to determine the AN/AYK-14 hardware status. If the hardware is not sufficiently functional to complete system initialization, the OSS shall inform the Mbus controller and shall then terminate. Otherwise, the OSS shall continue system initialization by initializing the System Status Table.

The System Status Table contains, at any time during the mission, the information to restore the system in event of a power interruption. The table includes the status of all the AIDS hardware modules, the current mission mode, and the values of any crew-controlled system parameters such as communication frequencies and format selection. If the OSS is initializing from a cold-start, it will construct this table according to defaults established at system generation. Examples of these defaults are that all hardware is operational, the mission mode is preflight, and there are no selected communication frequencies. If the OSS is initializing from either a warm-start or an AN/AYK-14 recovery, the System Status Table shall be initialized by copying from the mass memory system the last version of this table which was written into the System Status File.

Once the System Status Table has been initialized, the OSS shall then initialize the rest of the AIDS according to the System Status Table and the initialization code. First, the OSS shall transmit to the Mbus controller the message routing table. The routing paths contained in the table shall be determined according to the System Status Table. The OSS shall begin the system processing by activating the OSS Reconfiguration Process. Following this activation, system initialization terminates.

Upon activation on a cold-start, the Reconfiguration Process shall first load DPICS and MPICS with the tables which describe the interpretation of the programmable switches. Several versions of these tables will be stored in the mass memory, where each version applies to a particular ICS usage (e.g., Pilot ICS, TACCO ICS, and CICO ICS). The Reconfiguration Process shall determine which version to load by referencing the System Status Table. Also on a cold-start, after loading the MPICS and DPICS tables, the Reconfiguration Process shall request the Overlay function to load the data processor memory with the application programs.

After loading the application programs and the DPICS and MPICS tables, the Reconfiguration Process shall activate MPICS and DPICS. Further system processing shall then be performed in response to crew commands communicated through these processes.

3.4.4.4 System Initialization Outputs

Output	Destination	Frequency
AN/AYK-14 Hardware Failure	Mbus Controller	Once
System Status	System Status Table	Once
Mbus Routing Table	Mbus Controller	Once
Process Activation	Reconfiguration	Once

3.4.4.5 System Initialization Special Requirements

None.

3.4.5 Reconfiguration Requirements

Reconfiguration is responsible for monitoring the health of all the AIDS hardware and for reconfiguring the system in response to hardware failures. Reconfiguration does not exist as a single program; rather, it is distributed among a central Reconfiguration Process and the functions associated with the various AIDS hardware modules.

3.4.5.1 Reconfiguration Inputs

Input	Source	Frequency
AN/AYK-14 Hardware Status	IFPM	5 Hz
AN/AYK-14 Failure Interrupt	AN/AYK-14 (via SDEX/M)	Aperiodic
MIDER Status Tables	Other MIDERs	60 Hz
AIDS Module Failures	AIDS Modules	Aperiodic
Crew-Diagnosed Failures	Crew (via ICS)	Aperiodic
Current System Status	System Status Table	5 Hz
Revised AN/AYK-14 Program	Mass Memory	Aperiodic
Revised Formats	Mass Memory	Aperiodic
Revised ICP Tables	Mass Memory	Aperiodic

3.4.5.2 Reconfiguration Processing

The Reconfiguration Process shall control the configuration of both the AIDS software in the data processor and the AIDS hardware modules. The Reconfiguration Process executes as the primary HOL process and as such shall be responsible for activation of all other processes. In addition to this responsibility, the Reconfiguration Process shall coordinate the activity of the reconfiguration functions described below, periodically invoke the IFPM procedures, periodically record the System Status Table on the mass memory and periodically exchange status with the other MIDERs. This last item is described in detail below.

The inter-MIDER status exchange is performed by "send" and "receive" processes in each MIDER. (These processes are controlled by the Reconfiguration Process.) At 60 Hz, the send process appends the current clock time to the MIDER status table, and sends the table to the other data processor. The process need not wait for any success/failure indication from the transmission.

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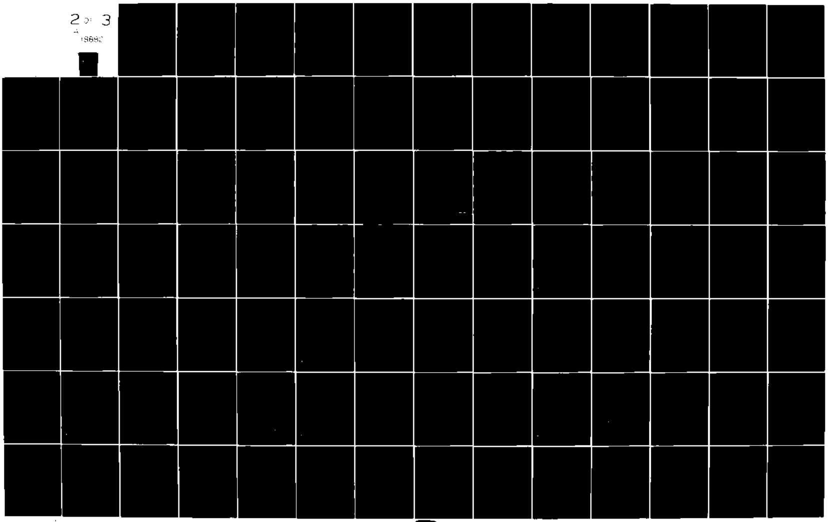

Also at 60 Hz, the receive process compares the input table entries with the corresponding entries in its own table and the differences are noted. If the time accompanying the input table is greater (i.e., later) than the current time in the receiving data processor, the received time is used to reset the current time; this assures that the clock times in the two data processors will eventually differ by no more than the transmission time.

If input tables fail to arrive at 60 Hz, the receive process attempts to isolate the failure point, which could be anything from the other data processor (i.e., the rest of the other MIDER works well), to complete failure of the other MIDER (e.g., its MIDER bus failed) or failure of the entire system. This last case can be ignored here because it is recognized more quickly through other means. The failure point(s) are determined by sending a request to each peripheral in the other MIDER which could be used. All those entries in the system status table are marked "down" until a peripheral responds. When a MIDER status table is received after missing one or more periods, the internal system status is updated and the process returns to its normal cycle.

Each reconfiguration function has two subfunctions: failure monitoring and failure response. Failure monitoring is continuously performed; failure response is invoked only when failure monitoring diagnoses a failure. Both the failure monitoring and response processing are distributed among the data processor programs according to their responsibilities. For example, the OSS monitors and responds to mass memory failures, the ODS responds to display failures, and DPICS responds to ICP failures. The complete allocation of reconfiguration responsibility is described in Table 3-11, the System Reconfiguration Specification Table. This table describes for each failure the data processor program which responds to the failure, the program's response, and the functional effect on AIDS as experienced by the crew. Before discussing the table in more detail, a general description of failure monitoring is presented.

The Reconfiguration Process and the reconfiguration functions perform both active and passive failure monitoring. The active failure monitoring comprises a periodic activation of the IFPM procedures, exchanging MIDER status tables among the MIDER's, and maintaining timeout limits for each external avionics subsystem which is supposed to transmit information to AIDS periodically. Passive failure monitoring comprises responding to the AN/AYK-14 failure interrupts, responding to failures diagnosed by the various AIDS modules BIT processing, and responding to crew commands which indicate a hardware failure.

As stated above, Table 3-11 describes the specific response performed for each failure diagnosed by the data processor. Before performing this specific response, the following common response shall be performed. First, the failure shall be entered in the System Status Table. Next, the SIGNAL ERROR OSS function shall be called. This call will cause the occurrence of the failure to be displayed to the crew. In addition, this call may result in termination of the process which diagnosed the failure. Such termination would be requested if, as a result of the failure, no further processing by the process would be productive. Finally, following performance of the specific response, any resulting changes in system status shall be entered in the System Status Table.

TABLE 3-11. SYSTEM RECONFIGURATION SPECIFICATION (Page 1 of 3)

Failure	Failure Handler	Response	Functional Affect
AN/AYK-14 Internal Failures:			
Memory Failure:			
Spare pages available	OSS	Replace failed pages.	None
Spare pages not available		Reconfigure memory with smaller system. If no smaller system exists, terminate processing.	System Degradation
I/O Failure	OSS	No communication possible, terminate processing.	System Degradation
Hardware Failure	OSS	Terminate processing.	System Degradation
Power Fault	OSS	Set initiation code to AN/AYK-14 Power Recovery and terminate processing.	System Degradation
Thermal Overload	OSS	Terminate processing.	System Degradation
Floating Point Underflow	OSS	Restart program.	None
CP Instruction Fault	OSS	Restart program	None
I/O Instruction Fault	OSS	Restart program.	None
Privileged Instruction Fault	OSS	Restart program.	None
Memory Protection Fault	OSS	Restart program.	None
Mass Memory Failure:			
Single Failure	OSS	Use alternate mass memory.	None
Complete Failure	OSS	Continue mission using only currently active formats.	System Degradation
Mbus Failure	OSS	No communication possible, terminate processing.	System Failure

TABLE 3-11. SYSTEM RECONFIGURATION SPECIFICATION (Page 2 of 3)

Failure	Failure Handler	Response	Functional Aspect
Ibus Failure:	OSS	Revise Mbus Routing to use alternate Ibus.	None
Single Failure		No communication possible, terminate processing.	System Failure
Xbus Failure:			
Single Failure	OSS	Revise Mbus routing table to use alternate Xbus	None
Complete Failure	OSS	No communication possible, terminate processing.	System Failure
MIDER Failure:	OSS	Reconfigure with single MIDER system.	System Degradation
Command Input Device Failure			
MCP Failure	DPICS	Accept mode control from ICP or voice recognition.	System Degradation
ICP Failure	DPICS	Accept commands from alternate ICP or voice recognition.	System Degradation
Complete Failure	OSS	Reconfigure system to "automatic" configuration.	System Degradation
Voice Recognition Failure	DPICS	Accept commands from ICP.	System Degradation
Voice Synthesis Failure	ODS	Terminate voice synthesis; use display for information output.	None

TABLE 3-11. SYSTEM RECONFIGURATION SPECIFICATION (Page 3 of 3)

Failure	Failure Handler		Functional Aspect
RSG Failure	ODS	Reallocate RSGs according to pilot selection.	System Degradation
BIED Failure	ODS	Terminate Briefing Information Entry	System Degradation
Display Failure	ODS	Reallocate displays according to pilot selection.	System Degradation
Vbus Failure	ODS	Use stroke symbol generator for HUD.	System Degradation
External Avionics Subsystem Failure	ODS	Use backup subsystem if available. If not delete appropriate symbology from format.	System Degradation

Several of the entries in Table 3-11 which describe specific failure response require amplification. The "Functional Aspect" column describes the aspect of the failure as experienced by the crew. The aspect may be one of the following: "none," "system degradation," or "system failure." "None" indicates that a hardware module has failed for which there is a completely redundant module which when utilized results in no perceivable system degradation. "System degradation" indicates that either the volume of information exchanged with the crew will be decreased (e.g., a format is no longer displayed) or that the exchange will require more effort by the crew (e.g., the pilot must use an ICP, rather than the MCP, to enter mission mode changes). Finally, "system failure" indicates that no further information exchange will occur.

In response to 5 of the 10 AN/AYK-14 fault interrupts, Table 3-11 specifies a "restart program" response. The five interrupts with this response are caused by a software malfunction. The restart program response assumes that the malfunction occurred as a result of the software experiencing a combination of inputs which had not been anticipated nor tested. Further, it is assumed that if the program is reinitialized and restarted, the combination will not reoccur. Should the combination persist and the program continue to malfunction, the crew may then override the data processor by deselecting the malfunctioning program.

For several failures, Table 3-11 distinguishes between "single" and "complete" failure. The distinction is used for duplicated hardware modules. These modules include the mass memory, the Ibus, the Xbus, and the ICP's. A single failure is one in which one of the redundant modules has failed and at least one remains operational. A complete failure occurs when all the redundant modules have failed.

The last entry in Table 3-11 requiring amplification is the "automatic" configuration which is used following complete failure of all the command input devices. The automatic configuration selects for each mission mode the set of formats which provides the maximum amount of mission-critical and flight-critical information output to the crew. Further, the automatic configuration shall change mission modes according to the changes in the aircraft status.

3.4.5.3 Reconfiguration Outputs

Output	Destination	Frequency
Revised System Status	System Status Table	60 Hz
Revised Routing Table	Mbus Controller	Aperiodic
Revised Format Allocation	RSG's and Displays	Aperiodic
Revised ICP Allocation	DPICS and MPICS	Aperiodic
Revised AN/AYK-14 Program	AN/AYK-14 Memory	Aperiodic

Output	Destination	Frequency
AN/AYK-14 Power Recovery Code	Initialization Code Word	Aperiodic
Failure Notification	Crew (via ODS)	Aperiodic

3.4.5.4 Reconfiguration Special Requirements

None.

3.4.6 Overlay Requirements

The Overlay function of the OSS is responsible for loading the data processor with a new configuration of application programs. The programs are retrieved from the mass memory system. The Overlay function is invoked by the Reconfiguration Process in response to either a mission mode change or a hardware failure.

3.4.6.1 Overlay Inputs

Input	Source	Frequency
New Configuration File Name	Reconfiguration Process	Aperiodic

3.4.6.2 Overlay Processing

The Overlay function shall first determine that only the Reconfiguration Process is active; that is, there are no active processes which are going to be overlaid. Then the requested file shall be read into memory. The requested file must be a read-only file or an error is diagnosed. The OSS uses the File System to read the overlay file. Then the OSS returns control to the Reconfiguration Process which activates the next level of processes and thus the processing for the new mode is begun.

3.4.6.3 Overlay Outputs

Output	Destination	Frequency
New Configuration Program	Data Processor Memory	Aperiodic
New Page Register Settings	AN/AYK-14 Page Register (via SDEX/M)	Aperiodic

3.4.6.4 Overlay Special Requirements

None.

3.4.7 Briefing Information Entry Requirements

The Briefing Information Entry function of the OSS is responsible for reading the mission-specific data contained on the Briefing Information Entry Device (BIED) tape and transferring this data to the appropriate destination, both within and outside of AIDS.

3.4.7.1 Briefing Information Entry Inputs

Input	Source	Frequency
Initiate Briefing Information Entry Command	Pilot	Once
Briefing Information Data Records Data Destination Data	BIED	Once

3.4.7.2 Briefing Information Entry Processing

The Briefing Information Entry function of the OSS will be activated by DPICS in response to the appropriate command from the ICS. The OSS shall read the mission-specific data, record by record. Each record will be formatted to facilitate routing of the data. In particular, if the data is to be stored within AIDS, the record will describe the file which must be created in mass memory to contain the information. Using this information, the OSS shall request the File System to create a file of the required length and shall then copy the mission data from the BIED into this file. After copying the data, the OSS shall then redefine the file as read-only.

If the data in a BIED record is to be stored in an external avionics subsystem, the record will describe the required OUTPUT MESSAGE requests that the OSS must issue to transmit the data to its destination.

After processing all the data records, the OSS shall update the System Status Table to indicate completion of Briefing Information Entry. The OSS shall inform the crew that the information entry has been completed.

3.4.7.3 Briefing Information Entry Outputs

Output	Destinaton	Frequency
Mission Data Files	Mass Memory	Once
Mission Data Messages	External Avionics Subsystems	Once
Revised System Status	System Status Table	Once
Briefing Information Entry Complete Message	Crew (via ODS)	Once

3.4.7.4 Briefing Information Entry Special Requirements

None.

3.4.8 Switch Processing Requirements

The Switch Processing function shall be responsible for the processing of crew input through the ICS. Switch Processing shall involve interpretation and routing of switch commands (through the use of ACOL-specified command interpretations), validation of keyset entries, and notification to the crewmember of invalid keyset entries.

The processing requirements specified in this section are the generic AIDS switch processing requirements. These requirements are those necessary to accommodate any ICP switch configuration which is acceptable by the AIDS Command Formatter. Appendix B of this specification contains the specific switch configurations for the V/STOL-pilot, SENSO, TACCO, CICO, and ACO ICPs. The AIDS V/STOL switch processing shall correctly interpret the ACOL-generated tables corresponding to each of these configurations.

3.4.8.1 Switch Processing Inputs

Input	Source	Frequency
ACOL Command Table Fields Command Destination Command Code Keyset Value Range Force Stick Indicator	AIDS Command Formatter	Off-Line
MPICS Command Fields Command Index Keyset Value (Optional) Command Receipt Time	MPICS	Aperiodic

3.4.8.2 Switch Processing

Switch Processing of an MPICS switch command shall be performed on the basis of the command's specific processing requirements. Using the MPICS message's command index, the corresponding ACF-generated table entry shall be interrogated to establish the current command's description. If the ACF entry indicates that the command possesses an "associated value," then its value type (keyset or preset) will be established. If a keyset value (i.e., a data entry on the ICP) is indicated, Switch Processing shall validate the keyset value with its defined acceptable value range. If the keyset value fails its prescribed range test, a diagnostic message shall be emitted to both a designated SAD and to MPICS.

If Force Stick processing is required, the DPICS Force Stick process (reference Section 3.4.9) shall be activated (via OSS request). If HOTAS processing is required, the DPICS HOTAS process (reference Section 3.4.10) shall be activated

(via OSS request). In response to a switch command requiring the termination of Force Stick processing, Switch Processing shall terminate the Force Stick process (via OSS terminate request).

As defined by its command specification, the command may be destined for either an external avionics subsystem or an AIDS module. For the former, the command value, if any, shall be appended to the formatted message contained as part of its command specification prior to requesting the OSS to transmit the message. For the latter, the command shall be stored in the DPICS input command queue associated with the intended destination (e.g., a display function).

3.4.8.3 Switch Processing Outputs

Output	Destination	Frequency
Keyset Entry Diagnostic	SAD Program	Aperiodic
Keyset Entry Diagnostic	MPICS (via OSS)	Aperiodic
Internal Command Queue Fields Command Code Command Value	AIDS Function	Aperiodic
External Command Message Fields Command Code Command Value	External Avionics Subsystem (via OSS)	Aperiodic
Force Stick Activation Parameters Force Stick Value Destination Force Stick Transformation Function	Force Stick Function (via OSS)	Aperiodic

3.4.8.4 Switch Processing Special Requirements

1. The Switch Processing function shall be structured so that the ACF-generated command specification tables may be integrated into the Switch Processing code. The details of this integration appear in the "AIDS Command Formatter Users Guide" (King 80).

2. The Switch Processing function shall be reentrant.

3.4.9 Force Stick Requirements

The Force Stick function is responsible for periodically accepting force stick readings (X and Y digital values), converting these readings on the basis of the associated transformation function, and transmitting these readings to the destination system to which the force stick is currently allocated.

3.4.9.1 Force Stick Inputs

Input	Source	Frequency
Destination System	Switch Processing Function	Once
Transformation Function	Switch Processing Function	Once
Force Stick Values X Value Y Value	MPICS (via OSS)	20 Hz

3.4.9.2 Force Stick Processing

In response to a switch command requiring force stick input, Switch Processing shall activate the Force Stick function. As part of this activation, Switch Processing shall identify the destination system to which the force stick values are to be routed and the transformation function defining how the values are to be interpreted. Switch Processing will also request the OSS to begin accepting periodic force stick value messages from MPICS.

Upon the periodic reception of force stick readings, the Force Stick function shall convert these digital values using the destination system's associated transformation function. The transformation function will be a piecewise linear function defining the association of the force stick values with the designated destination system.

Processing of the transformed force stick readings shall be dependent upon its intended destination system. If the destination system is an external avionics subsystem, an associated force stick message shall be constructed and transmitted together with the current values via the Xbus. Otherwise, for an internal AIDS, the force stick values shall be routed to the destination's DPICS input queue. When Switch Processing receives the command signifying the termination of Force Stick processing, the OSS shall be requested to terminate the Force Stick process.

3.4.9.3 Force Stick Outputs

Output	Destination	Frequency
Transformed Force Stick Values X Value Y Value	External Avionics Subsystem (via OSS) or AIDS Program (via DPICS Input Queue)	20 Hz

3.4.9.4 Force Stick Special Requirements

1. The Force Stick function shall be reentrant.

3.4.10 HOTAS Requirements

The HOTAS requirements are TBD.

3.4.11 Voice Recognition Requirements

The voice recognition requirements are TBD.

3.4.12 Graphics Support Function

The Graphics Support function of the OSS provides the ODS with a high-level interface to the RSGs and the symbol generators in the HUD and the SADs.

3.4.12.1 Graphics Support Inputs

Input	Source	Frequency
CONFIGURE SG Parameters Symbol Generator Identifier, Configuration Parameters	ODS	Aperiodic
ASSIGN FORMAT TO SG Parameters Format Identifier Symbol Generator Identifier	ODS	Aperiodic
PUT PROCEDURES Parameters Rapid Change Name Replacement Value	ODS	Aperiodic
UPDATE SG Parameter Symbol Generator Identifier	ODS	Aperiodic
STOP SG Parameter Symbol Generator Identifier	ODS	Aperiodic
Format Change Command Templates	Mass Memory (via OSS)	Aperiodic

3.4.12.2 Graphics Support Processing

The details of Graphics Support processing will be described separately for CONFIGURE SG, ASSIGN FORMAT TO SG, the generic Put Procedures, UPDATE SG and STOP SG. Before proceeding to these details, the relevant data structures will be summarized.

For each symbol generator the Graphics Support shall maintain a data block called SG Control Block which describes the state of the symbol generator. This state includes an indication of whether a format has been loaded into the symbol generator, and, if so: (1) an indication of whether the symbol generator has been

started; (2) a list of format change command templates for the current format; and (3) an indication of which of these templates have been changed since the last update was transmitted to the symbol generator.

In addition to the symbol generator Control Blocks, data structures shall exist for each individual format. For each format which can be displayed by a particular configuration of the ODS, there is a format description data structure and several rapid data change data structures. There is the format data structure which contains the file name of its SADI program. Each rapid change data structure identifies the format containing the rapid change and what parts and in what ways the SADI program (in a symbol generator) should be changed when the change occurs. The use of these data structures is described in the following descriptions of the Graphics Support processing.

The CONFIGURE SG procedure shall accept as parameters the specification of a symbol generator and the desired configuration parameters. CONFIGURE SG simply updates the appropriate symbol generator Control Block and transmits the required commands to the symbol generator.

The first action of ASSIGN FORMAT TO SG shall be to perform all the processing associated with STOP SG. Next, the File System shall be invoked to transmit the SADI program for the specified format into the specified symbol generator. At the same time, the display change command templates for the format shall be read (via the File System) into the Control Block for the specified symbol generator. Finally, the fact that the symbol generator needs to be started shall be recorded in its Control Block.

The processing for each Put Procedure shall begin by recording the replacement value in the specified rapid change data structure. Next, checking shall be performed to see if the format being changed is loaded in any symbol generator. If not, no further action is required. If the format, is loaded in a symbol generator, the appropriate display change command template shall be altered so that the next time it is sent to the symbol generator, the SADI program will change and a new picture will therefore be displayed. The fact that the template has changed shall be recorded for use by UPDATE FORMAT.

UPDATE FORMAT shall first transmit all of the format's display change commands which have been modified since the last call to UPDATE FORMAT for the specified format. Next UPDATE FORMAT determines the lowest level of the SADI program which must be reinterpreted by the symbol generator to affect all the transmitted display changes. If the symbol generator has not yet started to display the format it contains, interpretation must begin at level zero. After determining the required level, UPDATE FORMAT shall transmit an interpret command to the symbol generator.

The STOP SG function undoes the effect of an ASSIGN FORMAT TO SG invocation. If the specified symbol generator does not have a format loaded into it, no action is required. Otherwise, STOP SG shall signal the symbol generator to stop processing the SADI program and to remove from the crew's view any displayed information resulting from previous processing. STOP SG shall mark the appropriate format to indicate that it is no longer being displayed.

3.4.12.3 Graphics Support Outputs

Output	Destination	Frequency
Symbol Generator Stop Command	Symbol Generator (via OSS)	Aperiodic
Symbol Generator Initial Load Command	Symbol Generator (via File System)	Aperiodic
Symbol Generator Display Change Command	Symbol Generator (via OSS)	Aperiodic
Symbol Generator Interpret Command	Symbol Generator (via OSS)	Aperiodic
Updated Display Change Command	Symbol Generator Control Block	Aperiodic
Symbol Generator Status	Symbol Generator Control Block	Aperiodic
Updated Rapid Change Component Value	Rapid Change Data Structure	Aperiodic

3.4.12.4 Graphics Support Special Requirements

The Graphics Support procedures shall be reentrant.

3.4.13 Voice Synthesis Requirements

The voice synthesis requirements are TBD.

3.4.14 Video Input Requirements

The video input requirements are TBD.

3.4.15 Flight Data Display Requirements

The Flight Data Display function performs all processing associated with flight symbology display. Flight input sources are NAV, JTIDS, the BIED, the Helmet Position Sensor, and DPICS; display update processing is performed for the HUD, HMD, VSD, and HSD.

3.4.15.1 Flight Data Display Inputs

Input	Source	Frequency
Roll	NAV	60 Hz
Pitch	NAV	60 Hz
True Heading	NAV	20 Hz
Magnetic Heading	NAV	20 Hz
North Velocity	NAV	20 Hz
East Velocity	NAV	20 Hz
Vertical Velocity	NAV	20 Hz
Radar Altitude	NAV	20 Hz
Barometric Altitude	NAV	20 Hz
True Airspeed	NAV	20 Hz
Indicated Airspeed	NAV	20 Hz
Mach Number	NAV	20 Hz
Wind Speed	NAV	20 Hz
Wind Bearing	NAV	20 Hz
Latitude	NAV	20 Hz
Longitude	NAV	20 Hz
Roll Command	JTIDS	20 Hz
Pitch Command	JTIDS	20 Hz
Command Heading	JTIDS	20 Hz
Command Altitude	JTIDS	20 Hz
Command Airspeed	JTIDS	20 Hz
Vertical (Glide Slope) Error	JTIDS	20 Hz
Lateral (Localizer) Error	JTIDS	20 Hz
Time	JTIDS	20 Hz
Data Link Ref Pt, Lat.	JTIDS	20 Hz
Data Link Ref Pt, Long.	JTIDS	20 Hz
Wave-Off	JTIDS	20 Hz
TACAN Range	JTIDS	20 Hz
TACAN Bearing	JTIDS	20 Hz
Waypoint/Checkpoint Pos, Lat.	BIED	Once
Waypoint/Checkpoint Pos, Long.	BIED	Once
Helmet Roll	Helmet Position Sensor	60 Hz
Helmet Pitch	Helmet Position Sensor	60 Hz
Helmet Heading	Helmet Position Sensor	60 Hz
Format Controls	Pilot (via MPICS and DPICS)	Aperiodic

3.4.15.2 Flight Data Display Processing

The Flight Data Display Processing comprises both functions common to all the formats controlled by Flight Data Display and functions specific to each format. The common processing includes three subfunctions: input

data processing, sensor validity verification, and sensor failure and recovery processing. In the description below, the three common subfunctions are described first, then the generic update display processing which is applicable to all formats, and finally the specific processing required for each format. Each format's processing description contains a brief explanation of the format's use and its symbology, a figure illustrating the format, and a table specifying the required symbology dynamics.

Periodically at 60 Hz and 20 Hz the Input Data Processing shall process the input data buffers (maintained by the OSS) which contain each flight parameter value and associated sample reference time. For each input parameter requiring processing (all sensor values are not sampled at the same rate), a comparison shall be made between the input buffer sample time and the sensor's most recent sample time maintained in the flight parameter data base. In the event that the input buffer time is more recent (i.e., availability of a new sensor measurement) the flight parameter value shall be converted into its corresponding AIDS internal format. The converted parameter value and associated sample time shall then be stored in the flight parameter data base for subsequent use in the validity verification process. In the event that a new sensor measurement was not received, the sensor failure and recovery process shall be invoked.

Validity Verification Processing shall evaluate those flight parameter values specifically designated as having been updated from a previous sample period. Each changed flight parameter value shall initially be evaluated in accordance with its defined acceptable sensor value range and rate of change. Each sensor parameter failing its boundary value tests shall then be evaluated using a specialized verification test if the parameter value contains a discontinuity in its value range. For example, the flight heading sensor value may change from 358 to 0 without violating the rate of change. Failure to satisfy its verification tests shall result in the associated sensor being designated as having failed. Additionally, the sensor's associated "reactivation count" shall be reset prior to invoking the sensor failure and recovery process. The reactivation count is the number of valid sensor inputs required before the sensor can be designated acceptable.

The reactivation count of each sensor parameter which satisfies its verification test and is currently designated as failed shall be incremented. Additionally the sensor's status shall be set to acceptable if the reactivation count exceeds the preestablished reactivation threshold.

Update Display shall perform display device reallocation, format modifications, and the update of format symbology. An active display device which has failed shall be deactivated and its associated backup display device, if any, shall be activated. Formats requiring a display status change (placement onto/removal from a display) shall similarly be modified as required. If the display device is currently in the inactive state, processing is completed. Otherwise, subsequent processing shall be based upon specific display processing requirements.

Within the flight parameter data base, each currently active symbol shall be examined to determine whether a change in its visibility status is required. For each currently visible symbol, if a positional status change is required, its format position shall then be modified. The following text presents a descriptive summary of the Flight Data Display formats.

The HUD shall present four formats to the pilot on the basis of the existing mission mode. The formats are: Taxi, Takeoff/Cruise, Transition, and Landing.

Figure 3-30 illustrates the HUD Taxi format, which shall be displayed when the pilot selects the "TAXI" mode. The format contains only a heading scale. Table 3-12 specifies the Taxi format dynamics.

Figure 3-31 illustrates the HUD Takeoff/Cruise format, which is displayed when any of the takeoff modes, the CRUISE mode, or the SEARCH mode is selected. The format displays aircraft pitch, roll, vertical velocity, airspeed heading and altitude values and the corresponding command values. The format also displays the warning and breakaway symbols. Table 3-13 specifies the format's dynamics.

Figure 3-32 illustrates the HUD Transition format, which is displayed when the TRANSITION TO LANDING mode is selected. The format displays the aircraft's heading, airspeed, altitude, velocity vector, angle of attack, glideslope deviation, and localizer deviation. Table 3-14 specifies the format's dynamics.

Figure 3-33 illustrates the HUD Landing format, which is displayed when any of the three landing modes (CONVENTIONAL, SHORT, VERTICAL) is selected. The format displays a perspective image of the runway, along with the aircraft's pitch, heading, lateral acceleration, speed, vertical velocity, and engine torque. Command symbology for glideslope, speed, heading, and vertical velocity is also displayed. Table 3-15 specifies the format's dynamics.

The Helmet-Mounted Display presents two formats: Normal and Search. The HMD Normal format displays information similar to the HUD formats. The Normal format is displayed in all mission modes except SEARCH. The symbology visible in the Normal format is a function of mission mode. Figure 3-34 illustrates the Normal format with all possible symbology. During the TAXI mode, only the horizon with heading labels is visible. During the three takeoff modes, the two transition modes, and the CONVENTIONAL LANDING mode, the format contains a pitch ladder, velocity vector, and flight director. During the CRUISE, VERTICAL LANDING, and SHORT LANDING modes, only the horizon line is visible. Table 3-16 specifies the Normal format's dynamics.

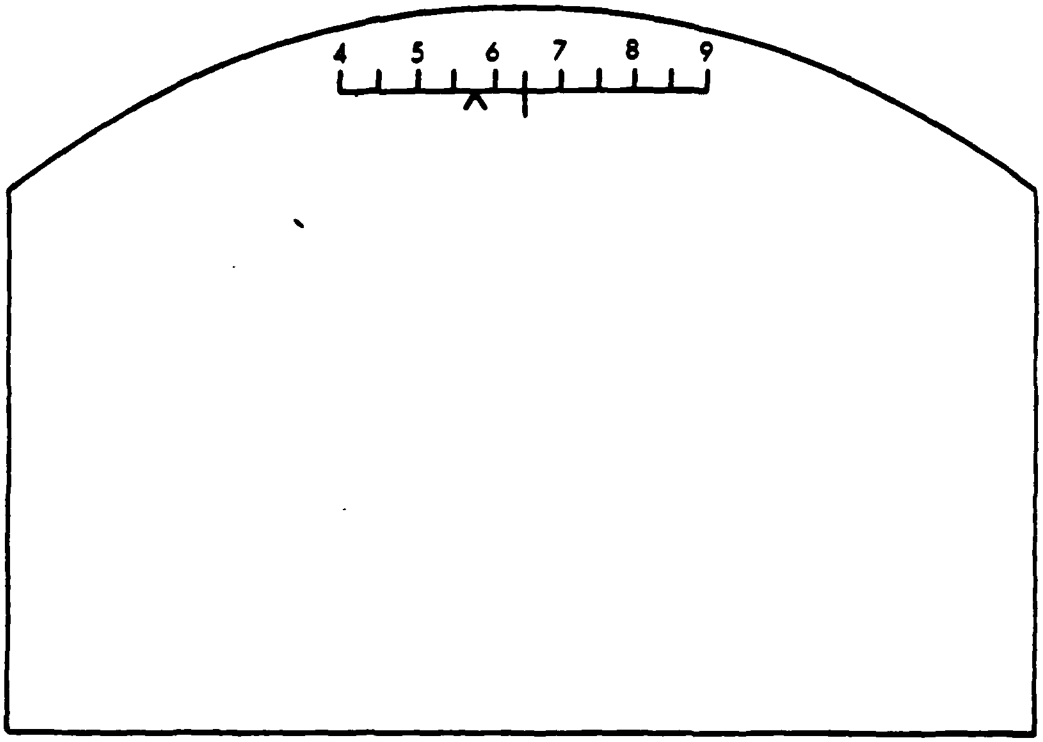

FIGURE 3-30 - HUD Taxi format

TABLE 3-12. HUD TAXI FORMAT DYNAMICS

Symbol	Controlling Parameter	Dynamics
Heading Scale	Magnetic Heading	Text Characters, Tick Marks X-position

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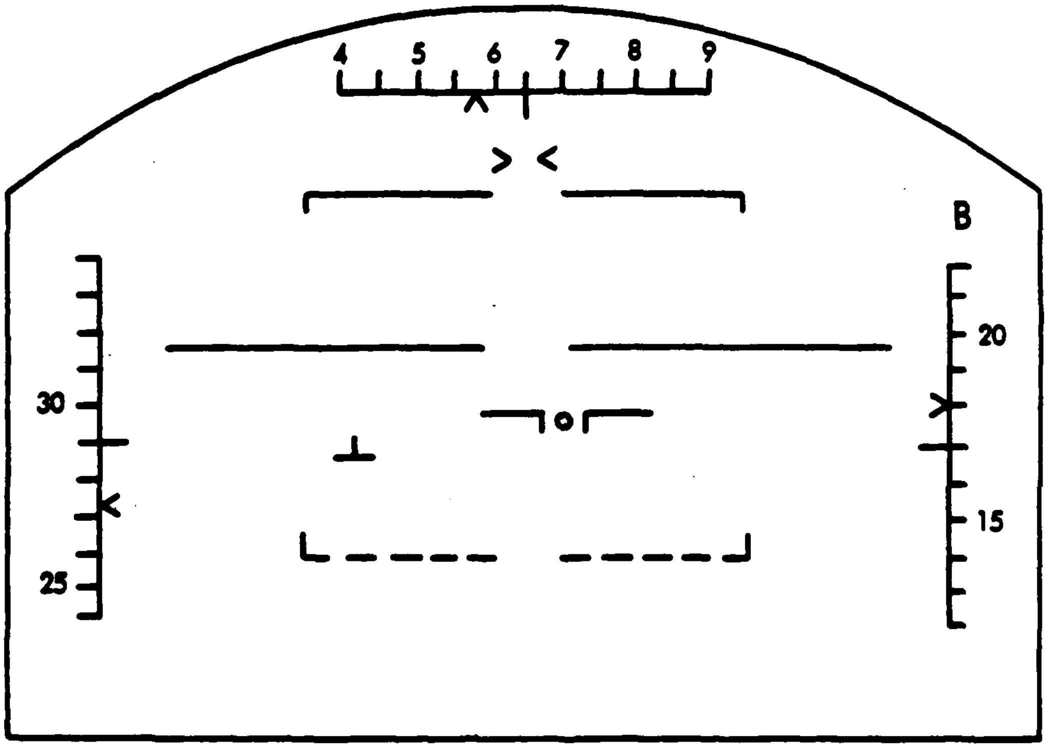

FIGURE 3-31 - HUD Takeoff/Cruise format

75357X50

TABLE 3-13. HUD TAKEOFF/CRUISE FORMAT DYNAMICS (Page 1 of 2)

Symbol	Controlling Parameter	Dynamics
Velocity Vector	Roll, Pitch, True Heading, North Velocity, East Velocity, Vertical Velocity	Position
Flight Director	TBD	Position
Breakaway	TBD	Visibility
Warning Indicator	TBD	Visibility
Horizon Line	Pitch, Roll	Position, Rotation
Pitch Ladder	Pilot Control Pitch, Roll	Visibility Position, Rotation Pitch Labels Text Characters
Heading Scale	Pilot Control Magnetic Heading	Visibility Tick Marks x-position Tape Labels Text Characters
	Command Heading	Command X-position
Vertical Velocity Scale	Pilot Control Vertical Velocity	Visibility Tick Marks -position Tape Labels Text
	TBD	Command Y-position
Airspeed Scale	Pilot Control True Airspeed	Visibility Tick Marks Y-position Tape Labels Text Characters
	Command Airspeed	Command Y-position
Mach Number Scale	Pilot Control Mach Number	Visibility Tick Marks Y-position Tape Labels Text Characters
	Command Mach Number	Command Y-position

TABLE 3-13. HUD TAKEOFF/CRUISE FORMAT DYNAMICS (Page 2 of 2)

Symbol	Controlling Parameter	Dynamics
Barometric Altitude Scale	Pilot Control Barometric Attitude	Visibility Tick Marks Y-position Tape Labels Text Characters
	Command Attitude	Command Y-position
Radar Altitude Scale	Pilot Control Radar Attitude	Tick Marks Y-position Tape Labels Text Characters
	Command Attitude	Command Y-position
Aircraft Reticle	Airspeed	Visibility

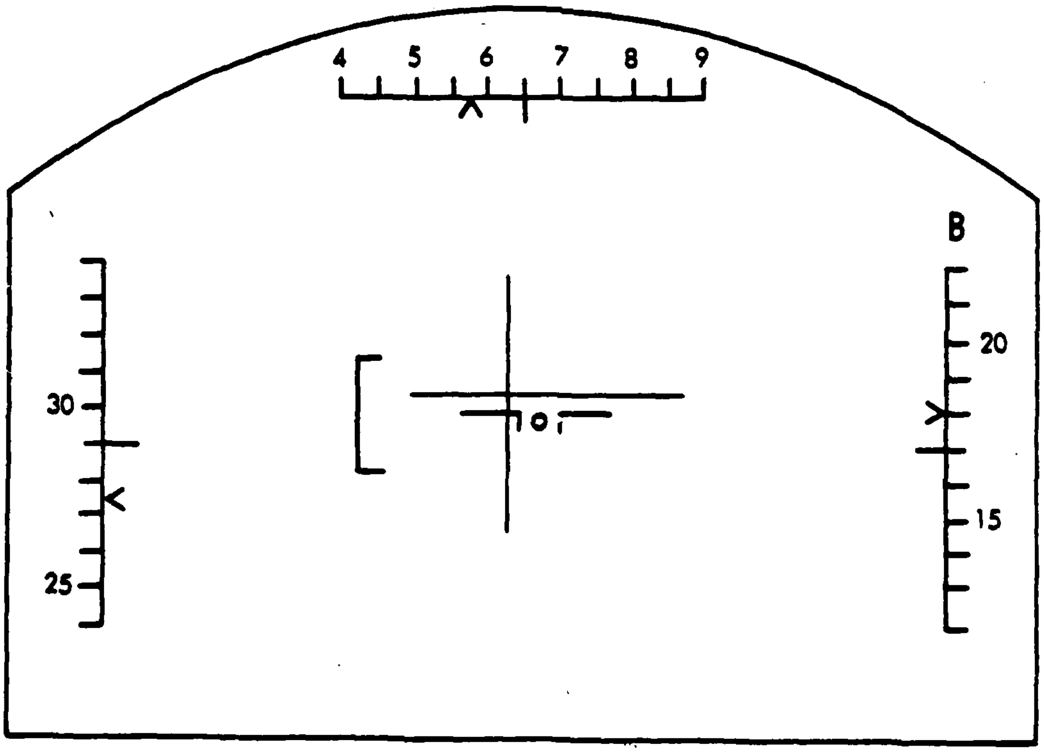

FIGURE 3-32 - HUD Transition Format

TABLE 3-14. HUD TRANSITION FORMAT DYNAMICS

Symbol	Controlling Parameter	Dynamics
Velocity Vector	Roll, Pitch, True Heading, North Velocity, East Velocity, Vertical Velocity	Position
Breakaway	TBD	Visibility
Warning Indicator	TBD	Visibility
Heading Scale	Pilot Control Magnetic Heading Command Heading	Visibility Tick Marks X-position Tape Labels Text Characters Command X-position
Airspeed Scale	Pilot Control True Airspeed Command Airspeed	Visibility Tick Marks Y-position Tape Labels Text Characters Command Y-position
Barometric Altitude Scale	Pilot Control Barometric Command Altitude	Visibility Tick Marks Y-position Tape Labels Text Characters Command Y-position
Radar Altitude Scale	Pilot Control Radar Altitude	Visibility Tick Marks Y-position Tape Labels Text Characters Command Y-position
Angle of Attack	Angle of Attack	Y-position
Glideslope Error	Glideslope Error	Y-position
Localizer Error	Localizer Error	X-position

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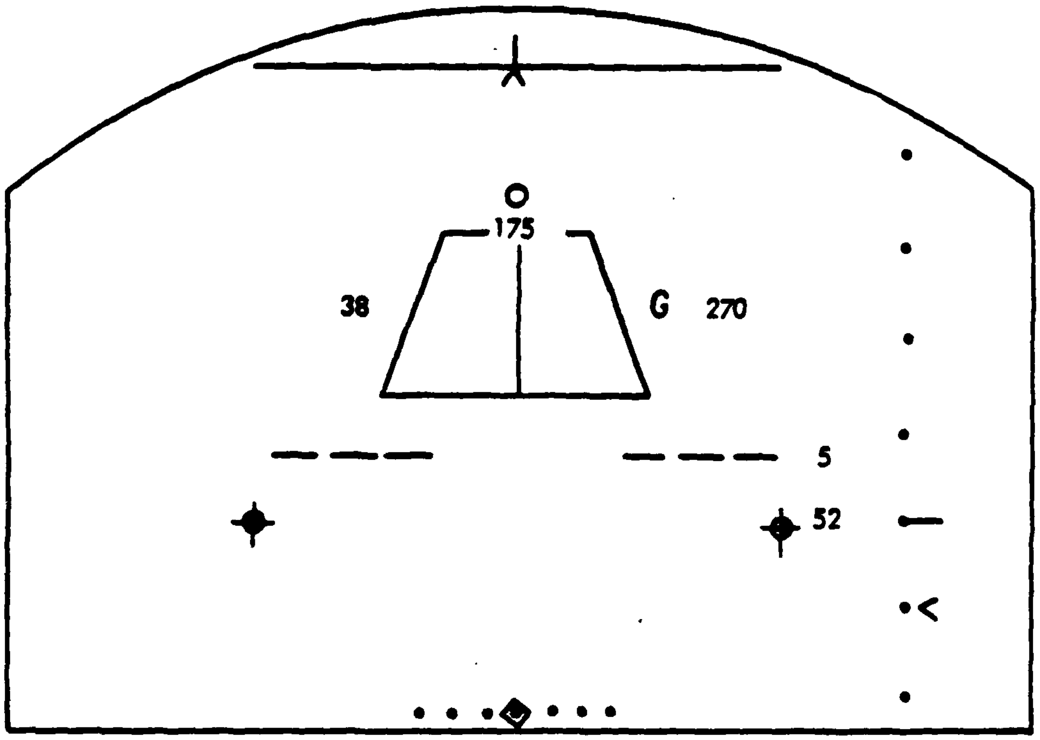

FIGURE 3-33 - HUD Landing Format

TABLE 3-15. HUD LANDING FORMAT DYNAMICS

Symbol	Controlling Parameters	Dynamics
Horizon Line	Pitch	Y-position
Auxiliary Pitch Line	Pitch	Y-position Pitch Labels Text Characters
Heading Tick	Magnetic Heading	Tick Marks X-position
Heading Text	Magnetic Heading	Text Characters
Command Heading Caret	Command Heading	Command X-position
Vertical Velocity Scale	Vertical Velocity TBD	Tick Marks Y-position Command Y-position
Airspeed Text	True Airspeed	Text Characters
Command Airspeed Diamond	Command Airspeed	Y-position
Barometric Altitude Text	Pilot Control Barometric Altitude	Visibility Text Characters
Radar Altitude Text	Pilot Control Radar Altitude	Visibility Text Characters
Glideslope Error Bar	Glideslope Error	Y-position
Glideslope Angle Text	Pilot Control TBD	Visibility Text Characters
Engine Torque Text	Pilot Control TBD	Visibility Text Characters
Wing Angle Tick	TBD	Y-position
Runway Image	TBD	TBD
Side Slip Circle	Side slip	X-position

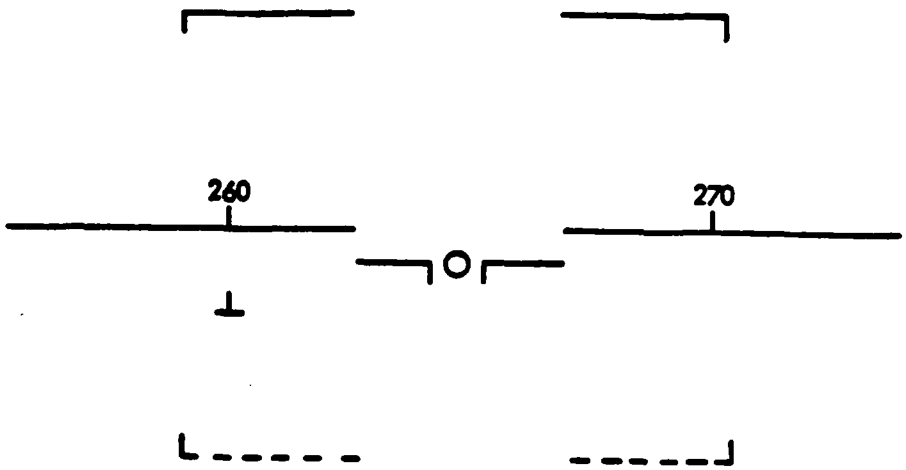

FIGURE 3-34 - HMD Normal Format

TABLE 3-16. HMD NORMAL FORMAT DYNAMICS

Symbol	Controlling Parameters	
Horizon Line	Helmet roll and pitch Aircraft roll and pitch	Position, Rotation
Pitch Ladder	Pilot Control Helmet roll and pitch Aircraft roll and pitch	Visibility Position, Rotation
Flight Director	Pilot Control Helment roll, pitch, and heading TBD	Visibility Position
Velocity Vector	Pilot Control Helmet roll, pitch, and heading Vertical velocity North Velocity, East Velocity	Visibility Position
Heading Marks	Pilot Control Helmet Heading Aircraft heading	Visibility Ticks Marks X-position Text Characters

The VSD presents two formats: a Pitch Ladder format and a Predictive format. The Pitch Ladder format is displayed during the three takeoff modes: the TRANSITION mode, the CRUISE mode, and the SEARCH mode. The format presents information similar to the HUD Takeoff/Cruise format.

The Predictive format presents a perspective representation of the ground plane and the predicted aircraft flight path. The predictive format is displayed during the TRANSITION TO LANDING mode and during the three landing modes. Figures 3-35 and 3-36 illustrate the two VSD formats and Tables 3-17 and 3-18 specify the format's dynamics.

The HSD shall display one format with optional content: map or flight plan. The map option illustrated in Figure 3-37 shall present flight status information and an optional compass rose superimposed on a map defining geographic terrain features. Format characteristics include: communications, target, and map scale status information (top region of display) and positional status and arrival time information (lower region of display). The flight plan option illustrated in Figure 3-38 shall present the same flight status information as in the map option except that the status information is superimposed onto a flight plan rather than a terrain map. Table 3-19 specifies the HUD format dynamics.

3.4.15.3 Flight Data Display Outputs

Output	Destination	Frequency
ASSIGN FORMAT Parameters	HUD, HMD, VSD, HSD (via Graphics Support)	Asynchronous
Put Procedure Parameters	Graphics Support	60 Hz, 20 Hz, 5Hz
UPDATE FORMAT Parameters	HUD, HMD, VSD (via Graphics Support)	60 Hz, 20 Hz
UPDATE FORMAT Parameters	HSD (via Graphics Support)	5 Hz

3.4.15.4 Flight Data Display Special Requirements

None.

3.4.16 Equipment Monitoring Requirements

The Equipment Monitoring function provides the pilot with aircraft and system status information through the maintenance of the AIDS SAD. The sources of the sensor inputs to this function will be the ULAIDS and IEIS.

3.4.16.1 Equipment Monitoring Inputs

The inputs to Equipment Monitoring shall include the status of all equipment on the aircraft. This status shall be transmitted to AIDS via ULAIDS, IEIS, and SOSTEL. The equipment to be monitored by AIDS is TBD.

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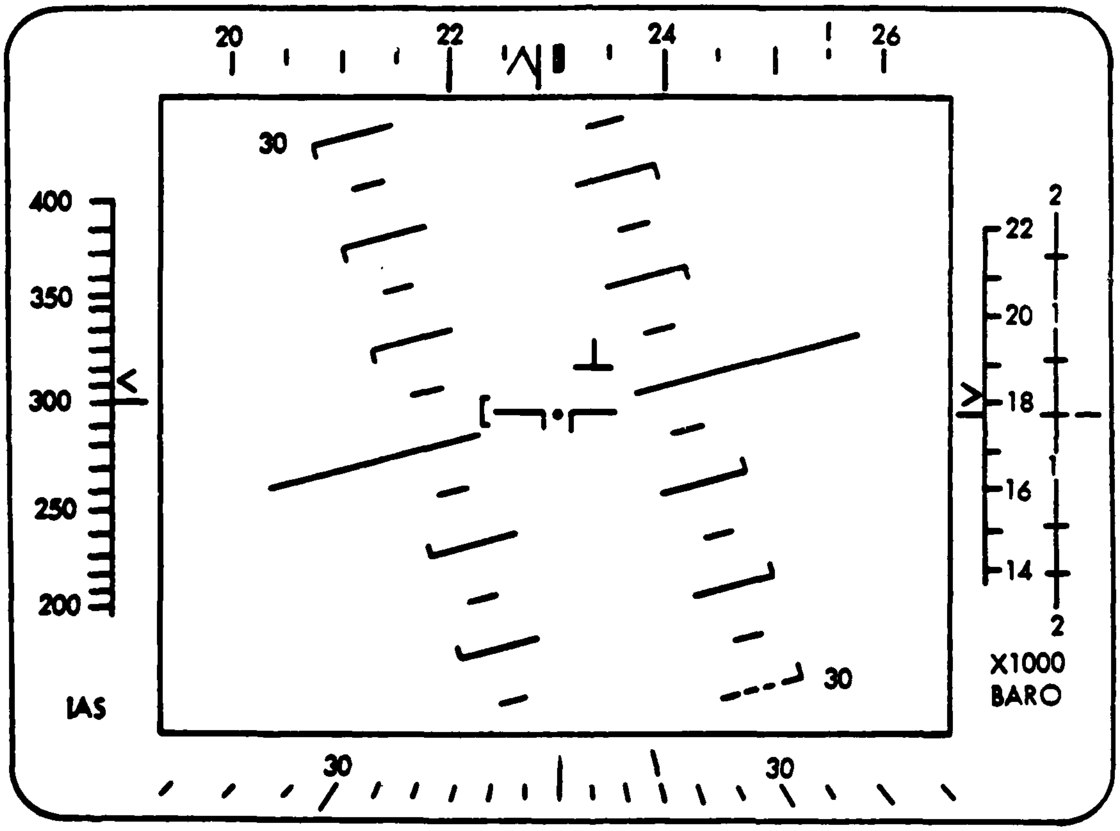

FIGURE 3-35 - VSD Pitch Ladder format

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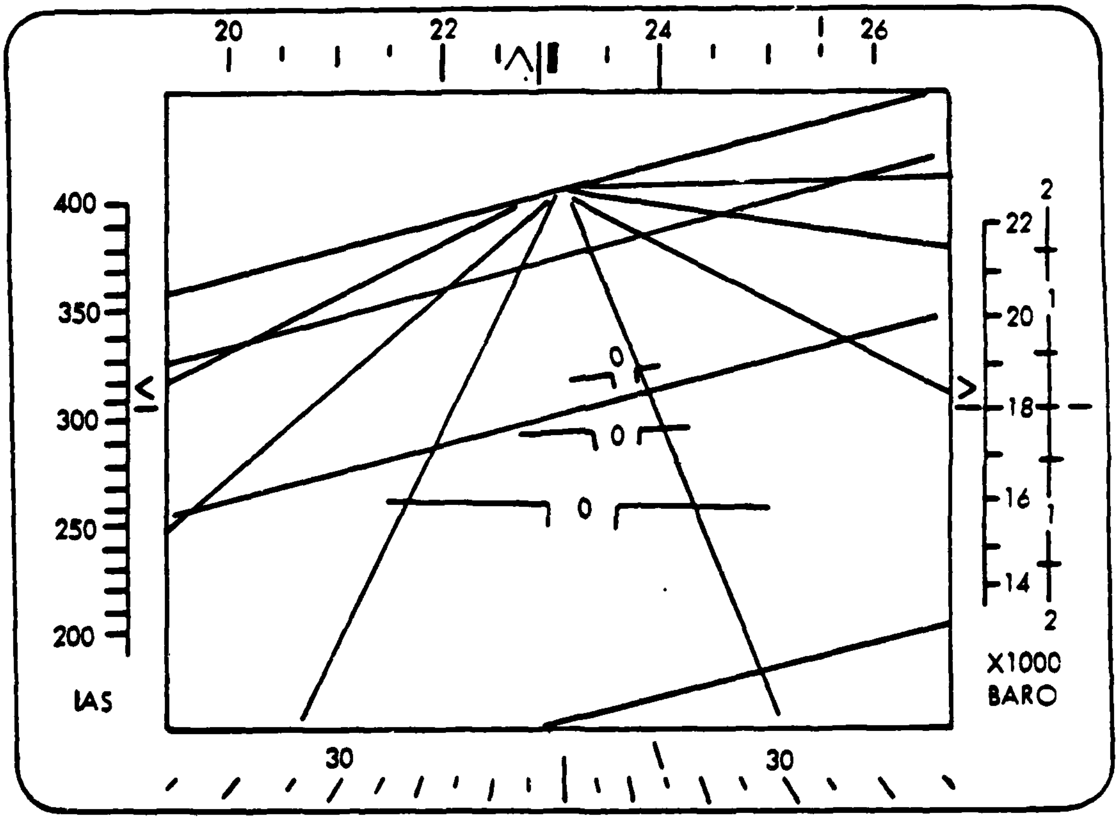

FIGURE 3-36 - VSD Predictive format

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TABLE 3-17. VSD PITCH LADDER FORMAT DYNAMICS

Symbol	Controlling Parameters	Dynamics
Velocity Vector	Roll, Pitch, True Heading, North Velocity, East Velocity, Vertical Velocity	Position
Flight Director	TBD	Position
Breakaway	TBD	Visibility
Warning Indicator	TBD	Visibility
Horizon Line	Pitch, Roll	Position, Rotation
Pitch Ladder	Pilot Control Pitch, Roll	Position, Rotation Pitch Labels Text Characters Visibility
Heading Scale	Magnetic Heading Command Heading	Tick Marks X-position Tape Labels Text Characters Command X-position
Vertical Velocity Scale	Pilot Control Vertical Velocity TBD	Visibility Tick Marks Y-position Tape Labels Text Characters Command X-position
Airspeed Scale	Pilot Control True Airspeed Command Airspeed	Visibility Tick Marks Y-position Tape Labels Text Characters Command X-position
Mach Number Scale	Pilot Control Mach Number Command Mach Number	Visibility Tick Marks Y-position Tape Labels Text Characters Command Y-position
Barometric Altitude Scale	Pilot Control Barometric Altitude Command Altitude	Visibility Tick Marks Y-position Tape Labels Text Characters Command Y-position
Radar Altitude	Pilot Control Radar Altitude Command Altitude	Visibility Ticks Marks Y-position Tape Labels Text Characters Command Y-position
Roll Scale	Roll	Tick Marks X-position Tick Mark rotation
Angle of Attack Bracket	Angle of Attack	Y-position

TABLE 3-18. VSD PREDICTIVE FORMAT DYNAMICS

Symbol	Controlling Parameters	Dynamics
Predicted Flight Path	TBD	TBD
Ground Plane Image	TBD	TBD
Breakaway	TBD	Visibility
Warning Indicator	TBD	Visibility
Heading Scale	Pilot Control Magnetic Heading Command Heading	Visibility Tick Marks X-position Tape Labels Text Characters Command X-position
Vertical Velocity Scale	Pilot Control Vertical Velocity TBD	Visibility Tick Marks Y-position Tape Labels Text Characters Command Y-position
Airspeed Scale	Pilot Control True Airspeed Command Airspeed	Visibility Tick Marks Y-position Tape Labels Text Characters Command Y-position
Mach Number Scale	Pilot Control Mach Number Command Mach Number	Visibility Tick Marks Y-position Tape Labels Text Characters Command Y-position
Barometric Altitude Scale	Pilot Control Barometric Altitude Command altitude	Visibility Tick Marks Y-position Tape Labels Text Characters Command Y-position
Radar Altitude Scale	Pilot Control Radar Altitude Command Altitude	Visibility Tick Marks Y-position Tape Labels Text Characters Command Y-position
Roll Scale	Roll	Tick Mark X-position and rotation

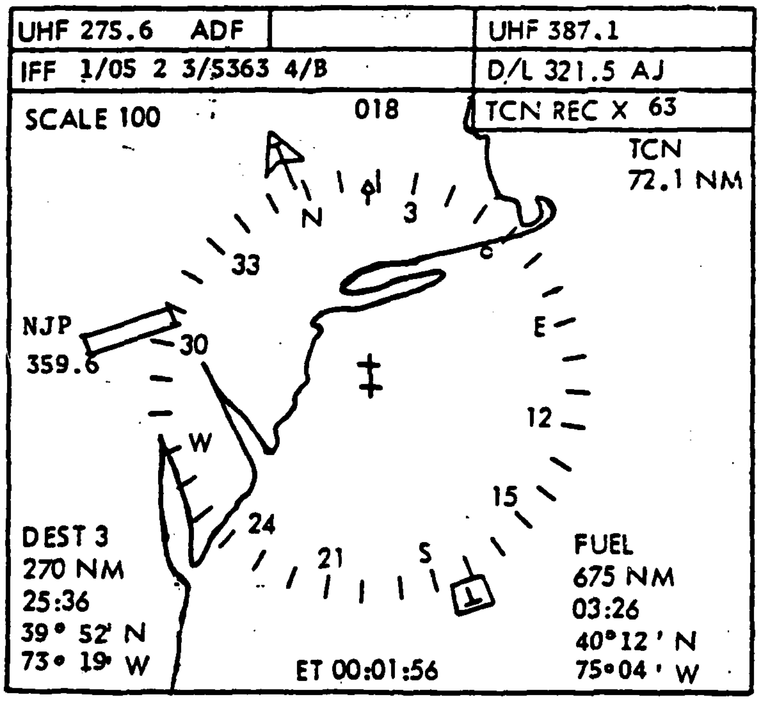

FIGURE 3-37 - HSD Format With Map Option

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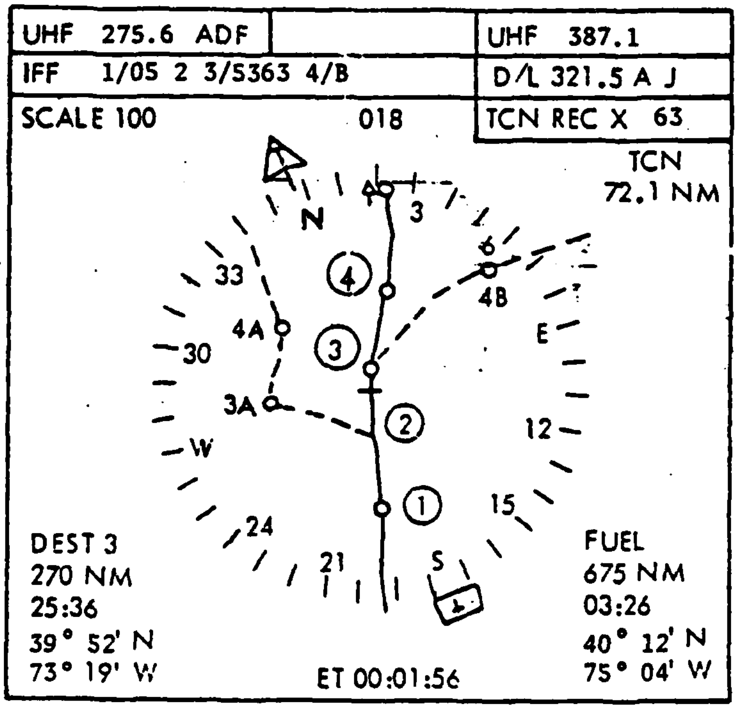

FIGURE 3-38 - HSD Format with Flight Plan Option

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TABLE 3-19. HSD FORMAT DYNAMICS

Symbol	Controlling Parameters	Dynamics
Terrain Map	TBD	TBD
Flight Plan	TBD	TBD
Compass Rose	Pilot Input Pilot Input Aircraft Position	Visibility Rotation Orientation Rotation
Aircraft Position	Pilot Input Aircraft Position	Position Orientation Rotation
Communication Annotation	TBD	TBD
Flight Status Annotation	TBD	TBD

The inputs to Equipment Monitoring shall also include pilot format control. These inputs are listed below.

Input	Source	Frequency
Checklist Selection	Pilot (via DPICS)	Aperiodic
Checklist Cursor Advancement	Pilot (via DPICS)	Aperiodic
Checklist Page Advancement	Pilot (via DPICS)	Aperiodic
Checklist Page Backup	Pilot (via DPICS)	Aperiodic
Engine Start Format Selection	Pilot (via DPICS)	Aperiodic
Sensor Failure Acknowledgement	Pilot (via DPICS)	Aperiodic
Status Format Selection	Pilot (via DPICS)	Aperiodic

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3.4.16.2 Equipment Monitoring Processing

The Equipment Monitoring function shall support three subfunctions: checklist interrogation, system status reporting, and engine start monitoring. A common data base which contains the status of all aircraft equipment shall be maintained in the performance of these three functions. In addition to equipment status, the data base contains a specification of the warning and caution limits values for each equipment, a specification of the checklists in which each equipment appears, and a specification of the position of the equipment in the aircraft equipment hierarchy (i.e., to which system and subsystem the equipment belongs). This data base and the specification of the corresponding checklists and system status formats are generated by the AIDS Equipment Display Formatter from a formal specification of the aircrafts' equipment hierarchy. The Equipment Display Formatter is described in the "AIDS Operational Display Software Program Performance Specification" (Roth 77). The remainder of this section specifies the processing required for the three Equipment Monitoring subfunctions.

Checklist Processing shall allow the pilot to visually inspect system flight parameters as defined by the specific flight operating mode. The checklists shall include: Interior Inspection, Briefing Data Entry, Engine Start, Post Start, Taxi, Vertical Takeoff, Short Takeoff, Descent, Vertical Landing, and Short Landing. A checklist format shall be comprised of a list of format pages delineating the associated sensors and values. The checklist will be presented on the advisory display in a prescribed sequential order. Checklist Processing input responses shall provide for page advancement and cursor advancement. The cursor position within a checklist page shall identify to the pilot a sensor failure. A cursor advancement input response shall result in the reposition of the cursor to the next failed sensor currently presented on the checklist page. If none remains within the existing page, page advancement shall be performed. A page advancement input response allows the pilot to bypass an interrogation of a sensor page list; in response, the Equipment Monitoring function shall display the next page within the sequential checklist. If no additional pages remain within the checklist, processing shall so inform the pilot. Checklist Processing shall also allow the pilot to back up to the preceding page. The content and format of the checklists are TBD.

The System Status Reporting function utilizes two generic formats: the Single Status List format and Dual Status List format. These are illustrated in Figures 3-39 and 3-40. Representative examples of the use of these formats are illustrated for the hydraulic and engine subystems in Figures 3-41 and 3-42. The Single Status List format contains the name of the equipment subsystem being displayed and the value and the in-tolerance/out-of-tolerance prompt for each sensor in the subsystem. The format also contains an indication of the status of the other aircraft equipment subsystems. The Dual Status List format presents the same information except that two values are presented for each sensor and no tolerance prompt is presented. The dual list is used for duplicated subsystems such as engines. Table 3-20 specifies the dynamics of the system status formats.

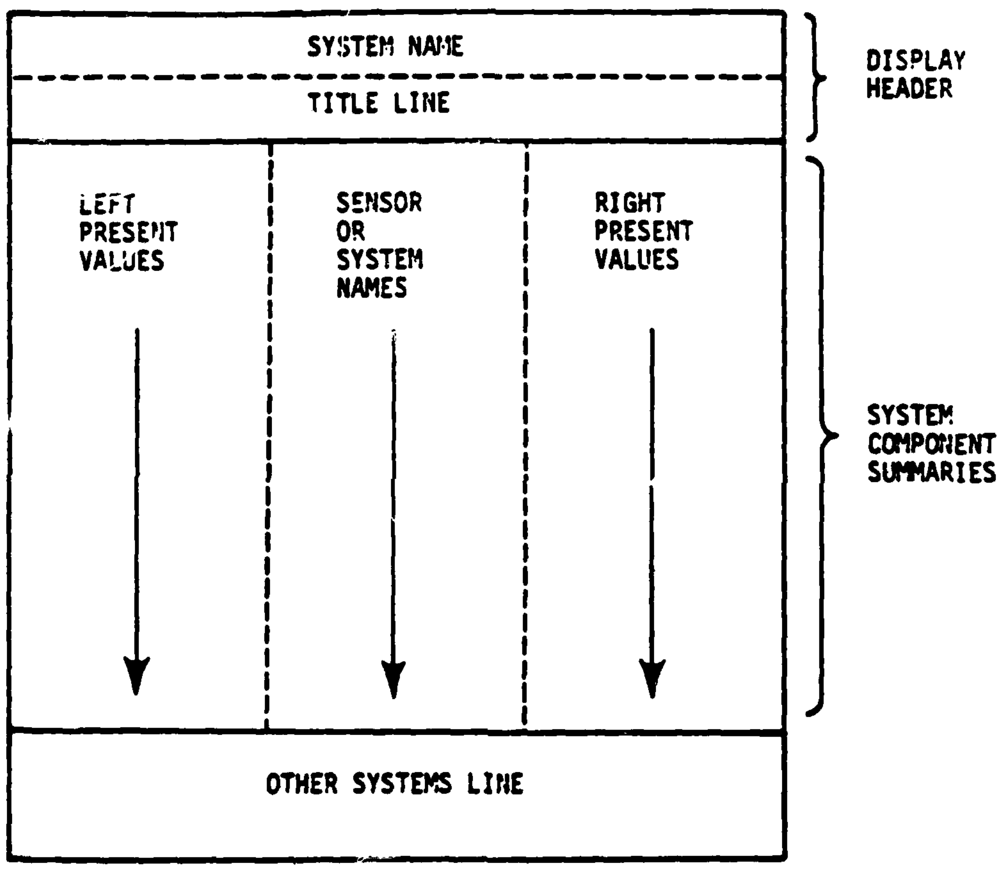

FIGURE 3-40 - Generic Dual Status List Format

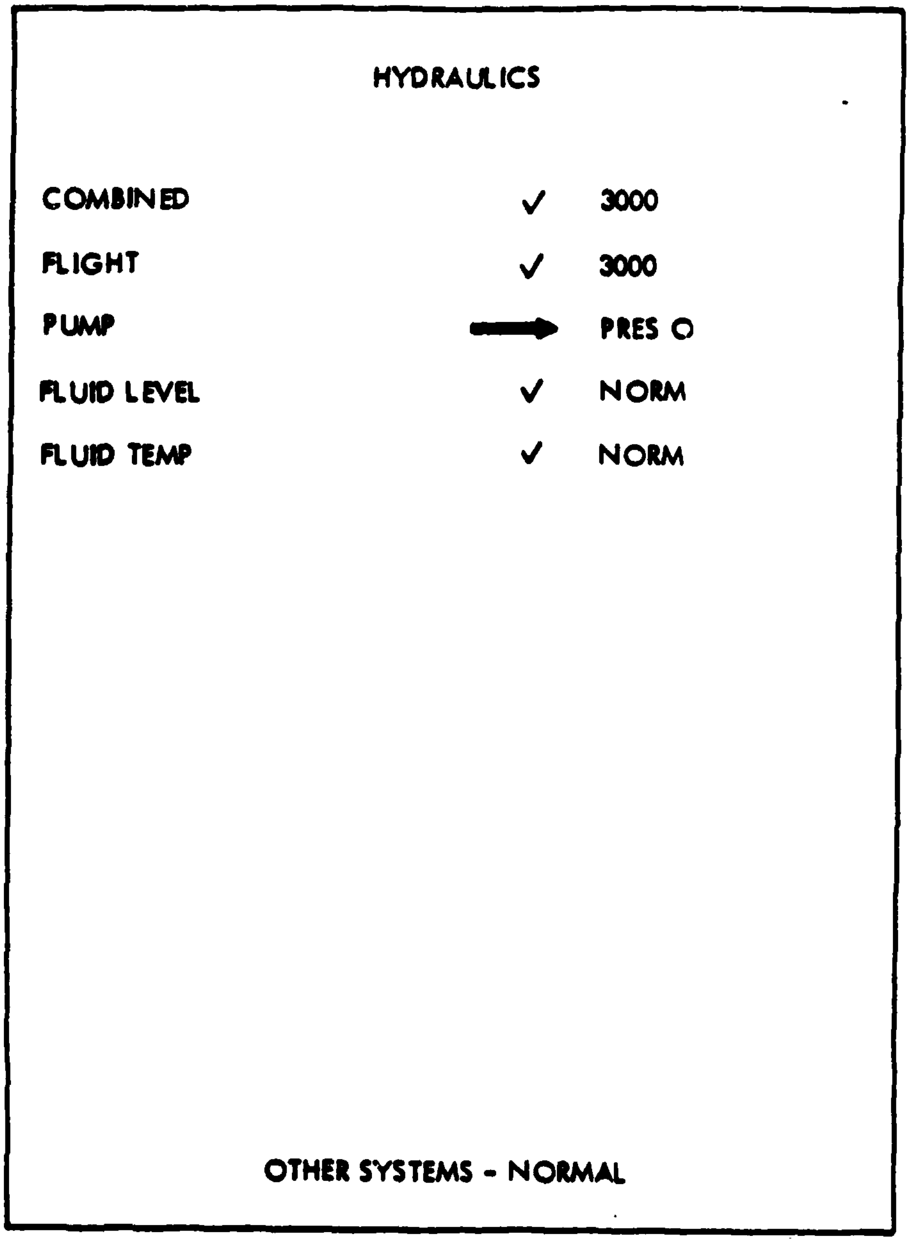

FIGURE 3-41 - Single Status List Format Example

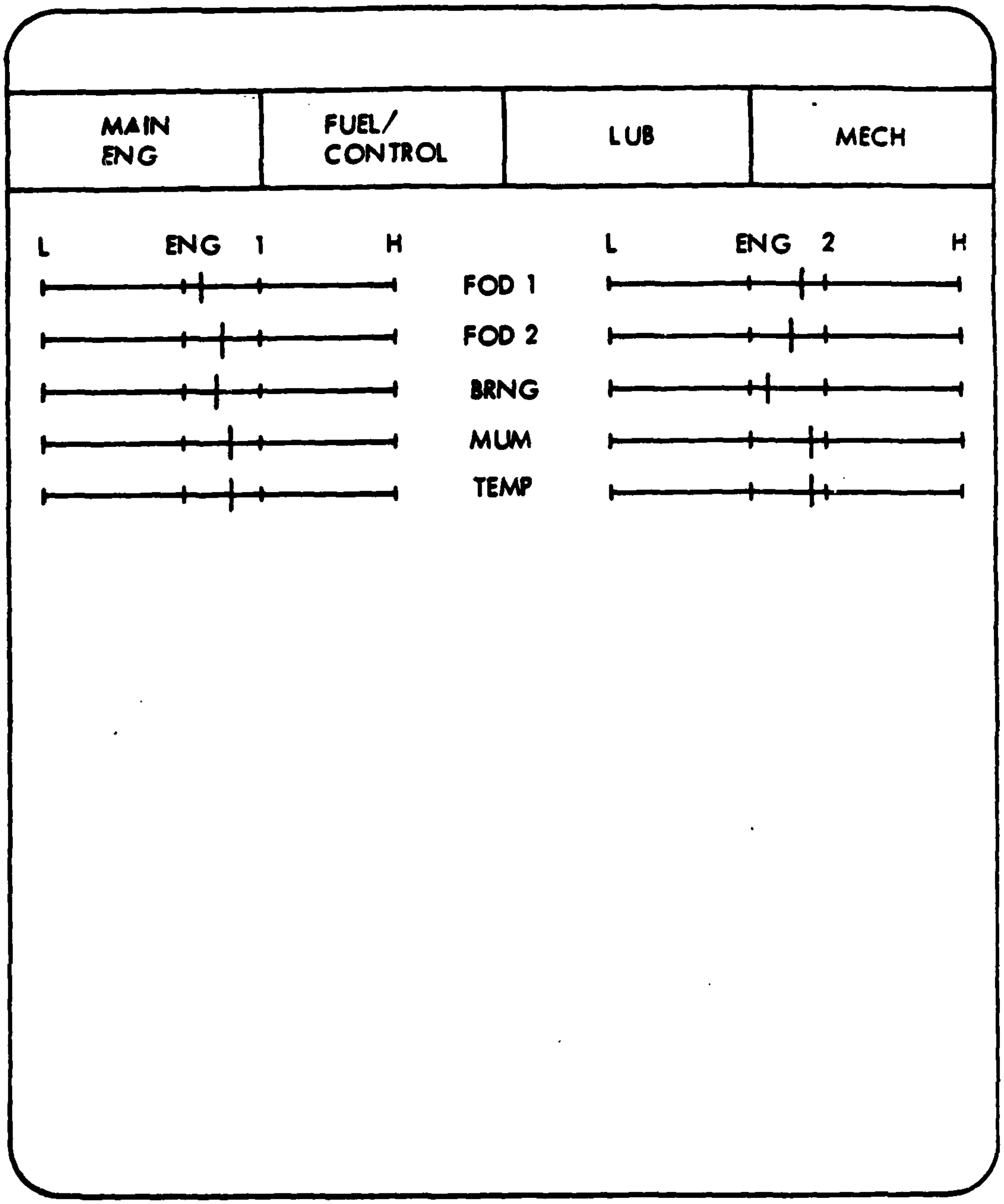

FIGURE 3-42 - Dual Status List Format Example

TABLE 3-20. SYSTEM STATUS FORMAT DYNAMICS

Symbol	Controlling Parameters	Dynamics
System Name	Name from Equipment Data Base	Text Characters
Sensor Tolerance Prompt	Sensor Value	Check Symbol Visibility Arrow Symbol Visibility
Sensor Value Text	Sensor Value	Text Characters
Sensor Value Bargraph	Sensor Value	Tick X-position
Other System Text	Other Systems Status	Text Characters

The specific equipment monitoring formats are TBD. The required generic processing for the system status function is discussed in the following paragraphs.

In response to the periodic sensor input messages from the ULAIDS and IEIS which correspond to those sensor values currently being displayed on the advisory display, the Equipment Monitoring function shall convert each sensor value to its internal AIDS representations. Each new sensor value shall be used to update the corresponding sensor value field of the existing advisory display format. For the Single Status List format, the present value and tolerance prompt symbols shall be modified. If the Dual Status List format is being displayed, the corresponding left or right present value fields shall be updated.

Upon the detection of a sensor failure occurrence, the ULAIDS or IEIS shall transmit (asynchronously) to Equipment Monitoring a sensor failure message. In response, Equipment Monitoring shall convert the sensor value to its corresponding AIDS internal format and the sensor's current value and associated "failure message" shall be placed in a failure queue. The failure message shall be displayed in the current advisory display format's "other system" line field.

Sensor Failure Acknowledgement Processing allows the pilot to request from the Equipment Monitoring function the presentation of detailed information describing a sensor failure occurrence. The presentation of sensor failure information corresponds to the display of a new format as defined by the existing "active" entry in the failure queue. The "active entry" in the failure queue will correspond to the "active failure message" currently presented on the advisory displays. In response to failure acknowledgement, the new display format and sensor requirements shall be established and sampling of the associated sensor values shall be subsequently requested from the ULAIDS and IEIS.

Format change processing shall allow the pilot to explicitly designate new format requirements to the Equipment Monitoring function. Analogous to the failure acknowledgement process, the new display format and sensor requirements shall be established and sampling of the associated sensor values shall subsequently be requested from the ULAIDS and IEIS.

The third function of Equipment Monitoring is engine start monitoring. This function displays the Engine Start format illustrated in Figure 3-43. The Engine Start format is displayed automatically after completion of the Engine Start Checklist Processing or in response to an explicit pilot request. The format contains a vertical bargraph indicating the current value of each engine's RPM; a text string also displays the RPM value. Table 3-21 specifies the Engine Start format's dynamics.

3.4.16.3 Equipment Monitoring Output

Output	Destination	Frequency
ASSIGN FORMAT Parameters	SAD (via Graphics Support)	Aperiodic
Put Procedure Parameters	Graphics Support	5 Hz
UPDATE FORMAT Parameters	SAD (via Graphics Support)	5 Hz

3.4.17 Communications Data Display Requirements

The Communications Data Display function is responsible for informing the pilot of the assignments of the communications equipment. The COMM external avionics subsystem supplies the inputs to Communications Data Display.

3.4.17.1 Communications Data Display Inputs

Input	Source	Frequency
UHF 1 on/off	COMM	5 Hz
UHF 1 channel	COMM	5 Hz
UHF 1 frequency	COMM	5 Hz
UHF 2 on/off	COMM	5 Hz
UHF 2 channel	COMM	5 Hz
UHF 2 frequency	COMM	5 Hz
VHF on/off	COMM	5 Hz
VHF channel	COMM	5 Hz
VHF frequency	COMM	5 Hz
IFF on/off	COMM	5 Hz
IFF Mode 1 on/off	COMM	5 Hz
IFF Mode 1 code	COMM	5 Hz
IFF Mode 2 on/off	COMM	5 Hz
IFF Mode 2 code	COMM	5 Hz
IFF Mode 3/A on/off	COMM	5 Hz
IFF Mode 3/A Code	COMM	5 Hz

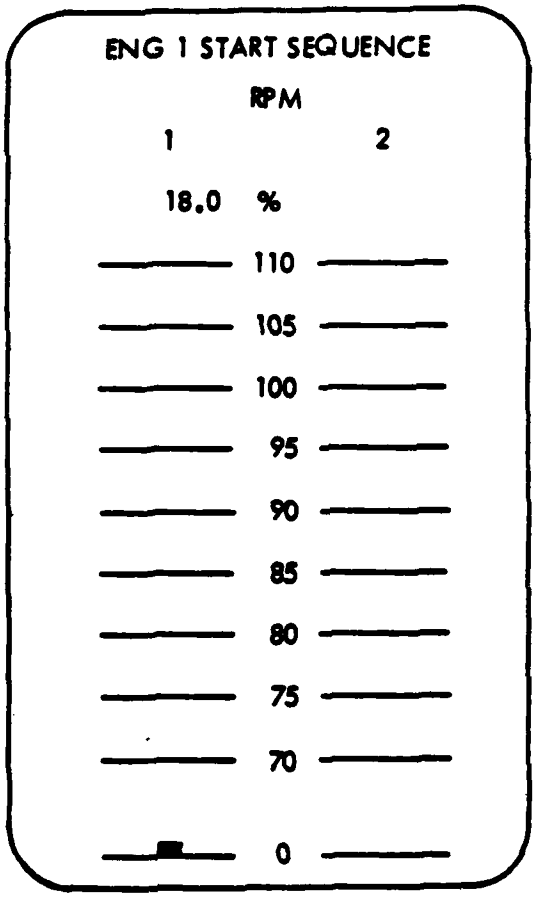

FIGURE 3-43 - Engine Start Format

TABLE 3-21. ENGINE START FORMAT DYNAMICS

Symbol	Controlling Parameter	Dynamics
Current Engine Text	TBD	Text Characters
RPM Bargraph	Engine RPM	Line Y-endpoint
RPM Text	Engine RPM	Text Characters

Input	Source	Frequency
IFF Mode 3/C on/off	COMM	5 Hz
IFF Mode 3/C Code	COMM	5 Hz
IFF Mode 4 on/off	COMM	5 Hz
IFF Mode 4 Code	COMM	5 Hz
Radar Beacon on/off	COMM	5 Hz
Radar Beacon Code	COMM	5 Hz

3.4.17.2 Communications Data Display Processing

When activated by an explicit pilot request for the COMM format, Communications Data Display shall display the COMM format illustrated in Figure 3-44 on either the LSAD or RSAD. The format shall be updated at 5 Hz. The dynamics of the COMM format are specified in Table 3-22.

3.4.17.3 Communications Data Display Outputs

Output	Destination	Frequency
ASSIGN FORMAT Parameters	SAD (via Graphics Support)	Aperiodic
Put Procedure Parameters	Graphics Support	5 Hz
UPDATE FORMAT Parameters	SAD (via Graphics Support)	5 Hz

3.4.17.4 Communications Data Display Special Requirements

None.

3.4.18 ASW Display Requirements

The ASW display requirements are TBD.

3.4.19 AEW Display Requirements

The AEW display requirements are TBD.

3.5 ADAPTATION

This section describes the configuration parameters and the resource requirements of the AIDS software. The configuration parameters are those compile-time or system-time values that allow the AIDS software to be configured to satisfy different mission requirements. The resource requirements are for primary memory, secondary storage, and processor throughput.

3.5.1 AIDS Configuration Control

This section specifies the AIDS software configuration parameters. The required ability to configure the AIDS software is discussed here, first in terms of specifying an approach to AIDS program generation that will ensure system flexibility, and then in terms of the specific configuration parameters.

COMM STATUS

		CHAN	FREQ
CMD UHF	ON	1	387.1
VHF/FM	OFF	2	133.8
ADF/AUX UHF	ON	3	275.6

		MODE	PWR	CODE
IFF	ON	1	ON	05
		2	ON	
		3/A	ON	5363
		3/C	ON	0220
		4	ON	B
RADAR BCN	ON	DOUBLE		3

FIGURE 3-44 - COMM Format

TABLE 3-22. COMM FORMAT DYNAMICS

Symbol	Controlling Parameters	Dynamics
UHF 1 on/off text	UHF 1 on/off	Text Characters
UHF 1 channel text	UHF 1 channel	Text Characters
UHF 1 frequency text	UHF 1 frequency	Text Characters
UHF 2 on/off text	UHF 2 on/off	Text Characters
UHF 2 channel text	UHF 2 channel	Text Characters
UHF 2 frequency text	UHF 2 frequency	Text Characters
VHF on/off text	VHF on/off	Text Characters
VHF channel text	VHF channel	Text Characters
VHF frequency text	VHF frequency	Text Characters
IFF on/off text	IFF on/off	Text Characters
IFF Mode 1 on/off text	IFF Mode 1 on/off	Text Characters
IFF Mode 1 code text	IFF Mode 1 code	Text Characters
IFF Mode 2 on/off text	IFF Mode 2 on/off	Text Characters
IFF Mode 2 code text	IFF Mode 2 code	Text Characters
IFF Mode 3/A on/off text	IFF Mode 3/A on/off	Text Characters
IFF Mode 3/A code text	IFF Mode 3/A code	Text Characters
IFF Mode 3/C on/off text	IFF Mode 3/C on/off	Text Characters
IFF Mode 3/C code text	IFF Mode 3/C code	Text Characters
IFF Mode 4 on/off text	IFF Mode 4 on/off	Text Characters
IFF Mode 4 code text	IFF Mode 4 code	Text Characters
Radar Beacon on/off text	Radar Beacon on/off	Text Characters
Radar Beacon code text	Radar Beacon code	Text Characters

3.5.1.1 AIDS Program Generation

This section discusses the flexibility requirements for the AIDS software, and the design presented in Sections 3.3.5 and 3.4 satisfies these requirements.

Achieving the goals of system flexibility for AIDS is complicated by the need for efficiency. The AIDS software must be capable of processing a large volume of inputs each second. It must achieve this throughput within a hardware configuration that does not severely impact aircraft size and weight restrictions.

Two techniques are used to meet the efficiency and flexibility requirements of the AIDS software. These are data-driven algorithms and off-line data base preparation. These two techniques are tightly coupled. The second cannot be utilized without the first.

Data-driven algorithms provide both efficiency and flexibility advantages. The efficiency advantages are primarily in the area of reduced memory requirements. Instead of repeating code for each instance of a function, a single generic function is used, instantiated each time by the information contained

within the data base. The use of data-driven algorithms provides added flexibility. Since information is contained within data bases as opposed to machine code, a great amount of dynamic flexibility is introduced. If one process wishes to alter the execution of another, it simply requires access to the latter's data base.

Off-line data base preparation has significant impact on both the flexibility and efficiency of the AIDS software. Through the use of off-line processors and compilation macros, the system's flexibility is greatly enhanced with no efficiency losses. In fact, the use of off-line preprocessors can lead to efficiency gains.

A prime example of the desirability of off-line processors can be found in the Equipment Display Formatter. Each new system included in V/STOL will contain a new set of aircraft sensors. When the Equipment Display Formatter is used, each new set of sensors may be quickly defined and compiled into the appropriate Equipment Monitoring data bases with very little impact on the AIDS ODS. In addition, the use of the Equipment Display Formatter will facilitate human factors analysis by permitting easy modification of the system monitoring formats.

Probably the most important aid to human factors analysis will be the AIDS Display Formatter. This tool will permit frequent and complex display changes to be made quickly and easily. In addition, through the rapid change mechanism, extremely efficient display update code can be generated.

The Standard AIDS Display Interface (SADI) will be fundamental to achieving the required flexibility. Standardization of the display command language ensures ability to mix and match displays. One can easily add new displays and exchange the functions of present displays.

Compilation macros shall be used in several places within the AIDS software. For example, the information pertaining to Flight Data Display input parameters (i.e., source, priority, alternates, and flight data base parameter to update) shall be declared using macros. This shall facilitate the addition of new input parameters. In general, whenever several data bases contain information pertaining to a set of parameters, this information shall be defined using compilation macros.

Another place where macros shall be used is in the insertion of debugging and performance monitoring code. This will provide the ability to easily insert and delete this code. It shall also create a uniform debugging interface and simplify the design of the data processor debugging communications.

An important flexibility aspect of the design presented in this specification is the functional division of the software. This division, as opposed to one along the lines of physical displays, is superior in terms of software flexibility. Each ODS subsystem (Flight Data Display, Equipment Monitoring, Communication Data Display, ASW Display, and AEW Display) is specified so that all physical display dependencies are encapsulated in the display update routines. This permits new displays to be added, simply by addition of a corresponding display routine. As long as information processing requirements remain

unchanged, the existing software need not be modified. This would permit, for example, the easy expansion of AIDS to service additional operator stations.

3.5.1.2 AIDS Configuration Parameters

The AIDS configuration parameters are TBD.

3.5.2 AIDS Resource Requirements

The AIDS system resource requirements are specified in three subsections: Primary Memory Requirements, Secondary Memory Requirements, and Throughput Requirements. The "Standard Reserve Capacity Requirements for Digital Combat System Processors" (Navy 72) requires that, for program acceptance, a program must have a 20-percent reserve for its resource requirements. The requirements listed below include this reserve. For program acceptance, this reserve may not be utilized.

3.5.2.1 AIDS Primary Memory Requirements

Listed below are: first, the primary memory requirements for SDEX/M and the 19 AIDS functions; and second, the corresponding primary requirements for the AIDS software in each of the four data processor configurations described in Section 3.2.1. Tabel 2-23 lists the memory requirements by function and Tables 3-24 through 3-27 list the memory requirements of each data processor.

3.5.2.2 AIDS Secondary Memory Requirements

Each AIDS mass memory must be capable of containing all the AIDS software and firmware, all the ICP configuration tables, all the format SADI programs and update tables, and the files written during the mission. The required number of words for all of this data is listed in Tables 3-28 and 3-29 for the ASW and AEW systems.

3.5.3 AIDS Throughput Requirements

The throughput requirements defined here are those required for the periodic display updates. The requirements do not explicitly include the requirements for aperiodic processing, namely ICP switch processing and mission mode changes. The throughput requirements are calculated by adding an estimate for operating system overhead to the basic computation time required for a display update. This estimate is 20 percent of the basic computation time. Computation is expressed as the percentage of the potential throughput of an AN/AYK-14 configured with an Extended Arithmetic Unit. Table 3-30 lists the throughput requirements of the Data Processor 1 (pilot) configuration.

TABLE 3-23. AIDS FUNCTION PRIMARY MEMORY REQUIREMENTS

AIDS Function	Instruction Words	Data Words
SDEX/M	5,700	2,000
I/O	4,500	1,500
File System	4,500	1,500
Performance Monitoring	2,600	500
System Initialization	2,600	200
Reconfiguration	4,500	500
Overlay	2,600	200
BIED	500	500
Switch Processing	3,000	3,000
Force Stick Processing	500	100
HOTAS	TBD	TBD
Graphics Support	3,000	1,000
Voice Synthesis	TBD	TBD
Voice Input	TBD	TBD
Voice Recognition	TBD	TBD
Flight Data Display	15,000	6,000
Equipment Monitoring	9,000	10,000
Communication Data Display	500	1,000
ASW Display	TBD	TBD
AEW Display	TBD	TBD

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TABLE 3-24. PRIMARY MEMORY REQUIREMENTS DATA PROCESSOR 1 (PILOT)

AIDS Function	Instruction Words	Data Words
SDEX/M	5,700	2,000
AIDS OS	21,300	3,400
BIED	500	500
Switch Processing	3,000	3,000
Force Stick Processing	500	100
HOTAS	TBD	TBD
Voice Recognition	TBD	TBD
Graphics Support	3,000	1,000
Voice Synthesis	TBD	TBD
Video Input	TBD	TBD
Flight Data Display	15,000	6,000
Equipment Monitoring	9,000	10,000
Communication Data Display	500	1,000
Subtotal	58,500 + TBD	27,000 + TBD
+ 20 %	11,700 + TBD	5,400 + TBD
TOTAL	70,200 + TBD	32,400 + TBD

TABLE 3-25. PRIMARY MEMORY REQUIREMENTS FOR ASW DATA PROCESSOR 2

AIDS Function	Instruction Words	Data Words
SDEX/M	5,700	2,000
AIDS OS	21,300	3,400
Graphics Support	3,000	1,000
Video Input	TBD	TBD
Flight Data Display	15,000	6,000
ASW Display	TBD	TBD
Subtotal	45,000 + TBD	12,400 + TBD
+ 20 %	9,000 + TBD	2,500 + TBD
TOTAL	54,000 + TBD	14,900 + TBD

TABLE 3-26. PRIMARY MEMORY REQUIREMENTS FOR ASW DATA PROCESSOR 3

AIDS Function	Instruction Words	Data Words
SDEX/M	5,700	2,000
AIDS OS	21,300	3,400
Switch Processing	3,000	3,000
Force Stick Processing	500	100
Graphics Support	3,000	1,000
Video Input	TBD	TBD
ASW Display	TBD	TBD
Subtotal	33,500 + TBD	9,500 + TBD
+ 20 %	6,700 + TBD	1,900 + TBD
TOTAL	40,200 + TBD	11,400 + TBD

TABLE 3-27. PRIMARY MEMORY REQUIREMENTS FOR AEW DATA PROCESSOR 2 (MISSION)

AIDS Function	Instruction Words	Data Words
SDEX/M	5,700	2,000
AIDS OS	21,300	3,400
Switch Processing	3,000	3,000
Force Stick Processing	500	100
Graphics Support	3,000	1,000
Video Input	TBD	TBD
Flight Data Display	15,000	6,000
AEW Display	TBD	TBD
Subtotal	48,500 + TBD	15,500 + TBD
+ 20 %	9,700 + TBD	3,100 + TBD
TOTAL	58,200 + TBD	18,600 + TBD

TABLE 3-28. MASS MEMORY REQUIREMENTS FOR ASW SYSTEM

Data	Number of Words
AIDS Software	60,000 + TBD
AIDS Firmware	~100,000
Pilot ICP Tables	
MPICS	4,000
DPICS	2,000
TACCO ICP Tables	
MPICS	~3,000
DPICS	~1,500
SENSO ICP Tables	
MPICS	~3,000
DPICS	~1,500
Flight Data Formats	
SADI Programs	5,000
Update Tables	5,000
Equipment Monitoring Formats	TBD
Communication Data Formats	
SADI Programs	300
Update Tables	300
ASW Data Formats	TBD
BIED Data Files	TBD
LOG File	5,000
Subtotal	196,000 + TBD
+ 20%	39,000 + TBD
TOTAL	235,000 + TBD

TABLE 3-29. MASS MEMORY REQUIREMENTS FOR AEW SYSTEM

Data	Number of Words
AIDS Software	60,000 + TBD
AIDS Firmware	~100,000
Pilot ICP Tables	
MPICS	4,000
DPICS	2,000
CICO ICP Tables	
MPICS	~3,000
DPICS	~1,500
ACO ICP Tables	
MPICS	~3,000
DPICS	~1,500
Flight Data Formats	
SADI Programs	5,000
Update Tables	5,000
Equipment Monitoring Formats	TBD
Communications Data Formats	
SADI Programs	300
Update Tables	300
AEW Data Formats	TBD
BIED Data Files	TBD
LOG File	5,000
Subtotal	196,000 + TBD
+ 20%	39,000 + TBD
TOTAL	235,000 + TBD

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TABLE 3-30. DATA PROCESSOR 1 (PILOT) THROUGHPUT REQUIREMENTS

AIDS Function	Required Throughput
Flight Data Display	30%
Equipment Monitoring	20%
Display Update Total	50%
20% OSS Overhead	10%
Subtotal	60%
20% Reserve	12%
TOTAL	72%

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SECTION 4

QUALITY ASSURANCE

4.1 GENERAL

This section defines the testing, documentation, and techniques which shall be used to ensure that the AIDS software meets the specifications listed in Section 3. This section also defines the AIDS software acceptance test criteria.

Four levels of program testing shall be used during the development of the AIDS software: function, program performance, system integration, and acceptance. Each of these levels is described separately in the following paragraphs.

Function Testing shall verify the correctness of algorithms. This testing shall address two questions: first, does the algorithm itself work in the abstract, and second, is the algorithm properly stated in the program code?

In addition, Function Testing shall be used to collect estimates on memory requirements and timing statistics. This information shall be monitored from the beginning in order to anticipate problems and give early feedback to both software and hardware designers. The estimates shall be updated continuously throughout testing to provide an increasingly more detailed picture of software performance.

Program Performance Testing shall address the integration of software units which were tested individually during Function Testing. These units shall be integrated to produce the major programs of the AIDS software, namely the OSS, ODS, and DPICS. Program Performance Testing shall be directed at the testing of interfaces, both software-to-software interfaces and software-to-hardware interfaces. An additional goal of Program Performance Testing shall be to update memory requirements and timing statistics.

Systems Integration Testing shall address the integration of the complete software and hardware laboratory system. It shall be the last level of testing prior to the Acceptance Demonstration. Testing shall include checkout of reconfiguration situations. In addition to exhaustive testing, Systems Integration Testing shall also involve performance tuning of some software algorithms.

The Software Acceptance Test is a demonstration of a representative sample of the total operational capabilities of the AIDS software. An independent Hardware Acceptance Test is assumed to have been performed successfully prior to the Software Acceptance Tests. The Software Acceptance Test shall demonstrate: use of the AIDS Display Formatter for off-line preparation of display software components; use of the AIDS Command Formatter for off-line preparation of ICS software components, management of and response to sensor data input, management of and response to mission data input, management of and response to crew input, display control, diagnosis of and recovery from faults, adaptation to failure situations, and graceful degradation in the presence of irrecoverable failures.

For each of the above testing levels, a separate test plan shall be prepared. Additionally, test specifications and reports shall be prepared as part of the deliverable AIDS software data base. Finally, test procedures shall be prepared for the acceptance test.

The following two subsections describe the requirements for all testing levels and the acceptance test criteria.

4.2 TEST REQUIREMENTS

This section describes for the Function, Program Performance, and System Integration Testing levels, the tools and techniques to be used. The tools and techniques are discussed according to level and then according to the major programs of the AIDS software.

The same hardware and software tools are required for both Function and Program Performance Testing. For these levels of testing, the AIDS software shall be tested through the use of an AN/AYK-14, a MIDER simulator, and a display simulator. The two latter hardware modules will presumably be a commercial minicomputer and a commercial interactive display device. The AIDS software shall be developed through the Facility for Automated Software Production (FASP) and will reside in FASP data bases, as will the test procedures and test data. FASP is described in the "FASP Software Production and Maintenance Methodology" (Boyd 78). Note that with the exception of the AN/AYK-14, Function and Program Performance Testing is quite independent of the actual AIDS hardware. This is intended to restrict the uncertainty in the testing situation to the software alone. In terms of required software tools, Function and Program Performance Testing require the AIDS FASP, the HOL debugger for CMS-2M, and the MIDER display simulation software.

For Function and Program Testing, all test input shall be hand-generated data stored in the FASP data base. Because the data is hand-generated, there is no intention to make Function Testing truly exhaustive. Function Testing shall be directed at exercising the main-line capabilities of the units being tested; this can be monitored using the path analysis (trace) feature of the HOL debugger.

The test outputs shall be hand-checked for correctness. Once this has been done, they shall be recorded in the FASP data base as a standard against which new test results can be automatically compared for detection of side-effects. Such recording of test results will be delayed until the modules have reached a steady state of development, at which time the test results are also in a steady state.

For System Integration Testing, the full set of support software will be employed. This includes FASP, the HOL debugger, the CMS-2M compiler, the FORTRAN compiler, the cross-assembler, the Performance Monitoring function of the OSS, and a Data Reduction program.

The hardware configuration will include the NADC Central Computer System (CCS) B machine in dedicated real-time with the AIDS hardware and an integration minicomputer. The off-line execution of the Display Formatter and the

Command Formatter will take place on the CCS, but not in real-time dedicated mode. Compilations and preparation of load tapes through FASP will take place on the CCS machine where the FASP data bases reside.

Flight scenarios shall be generated by hand for a variety of complete missions and mission modes; these scenarios form the input to a V/STOL Simulator, which executes on the CCS B machine. The simulator's output is the realistic data stream which forms the input to the AIDS software. The V/STOL Simulator will provide for the nondeterministic generation of hardware faults and failures both within the AIDS hardware and outside the AIDS hardware (in the external avionics subsystems). This is the mechanism by which reconfiguration behavior will be tested.

Output from these tests will come from several sources. The Data Recorder output will be processed by a Data Reduction program resident in the CCS. This will be the main source of hardcopy recorded test output information. In addition, use of the Debugger will produce memory listings which are processed and printed in symbolic form; this capability will be available for detailed examination of internal program snapshots. The visual images produced dynamically on the AIDS displays will also be an important part of the test results; visual inspection of the display behavior is an essential part of monitoring a test.

System Integration Testing analysis will be directed at three considerations: software functional behavior, software performance, and hardware behavior. Test analysis of software functional performance will be directed at determining whether or not the correct processing has been applied to the test inputs. Nonconforming functional behavior can be handled internally within the software staff. Test analysis of software performance will be directed at identifying exceptions to timing and memory requirements, or potential sources of improvements in timing and memory characteristics. Such analysis can have both software and hardware implications. Test analysis of hardware behavior will be directed at identifying any actual or potential aberrant hardware behavior during a test. This completes the description of the testing methodology for each testing level. Discussed below is the particular methodology to be used for each of the major AIDS software programs.

The testing of the OSS shall, at each level, validate each capability listed below in Section 4.3 as acceptance test criteria. An extremely critical part of OSS testing involves OSS response to hardware or software errors and to hardware failures. All single-point failures shall be generated during testing. Additionally, multiple-point failures shall also be generated to determine that the AIDS OSS provides the maximum possible configuration. At each level of testing, the primary and mass memory storage load maps and the Performance Monitoring function shall be used to verify that the AIDS OSS meets the resource requirements defined in Section 3.5.2.

Testing of DPICS shall utilize a standard ACOL test program, an MPICS simulator, an MPICS output recording utility, and a force-stick-value plot utility. The standard ACOL program will contain at least one utilization of each ACOL capability. The required hardware facilities are the CSS computers, the AN/AYK-14, the MIDER simulator, the display simulator and, for Systems Integration Testing, the complete AIDS hardware suite.

DPICS testing shall, at each level, validate all the capabilities which are listed below as acceptance test criteria. Additionally, testing shall analyze the DPICS response to random command inputs, erratic force stick values, excessively high command input frequency, and erroneous parameters. A standard interaction scenario will be used to test Command Processing, Force Stick Processing, and HOTAS Processing. The scenario will utilize all the capabilities contained in the standard ACOL test program. At each level of testing, the primary and mass memory storage load maps and the Performance Monitoring function shall be used to verify that DPICS meets the capacity requirements defined in Section 3.5.2.

Testing of the ODS shall utilize two standard flight scenarios (each defined as a set of crew actions and a Mission Preparation System specification), a standard equipment definition specification, the V/STOL Simulator, and a set of ADF-generated displayed formats. The two standard flight scenarios shall, in combination, exercise all display formats and each symbol within each format. The Equipment Monitoring test program will contain at least one utilization of each Equipment Monitoring feature. The Mission Preparation System specification shall exercise all the features of BIED input and shall cause all HSD symbology to be utilized during the flight scenarios. The required hardware facilities for ODS testing are: the CCS computers, the MIDER and display simulators, and, for System Integration Testing, the complete AIDS hardware suite.

4.3 ACCEPTANCE TEST REQUIREMENTS

The acceptance test requirements are TBD.

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APPENDIX A

GLOSSARY

A/C	Aircraft
ACF	AIDS Command Formatter
ACO	Air Control Officer
ACOL	AIDS Command Language
ADF	AIDS Display Formatter
ADF	AIDS Direction Finder
ADU	Auxiliary Display Unit
AEDDL	AIDS Equipment Display Description Language
AEF	AIDS Equipment Formatter
AEW	Airborne Early Warning
AIDS	Advanced Integrated Display System
ASW	Antisubmarine Warfare
BARO	Barometric
BC	Bus Controller
BIED	Briefing Information Entry Device
BIT	Built-in Test
BITE	Built-in Test Equipment
CCS	Central Computer System
CCU	Computer Control Unit
CI	Configuration Item
CICO	Combat Information Control Officer
CMS	Compiler Monitor System
COMM	Communications
DPICS	Data Processor ICS
EAU	Extended Arithmetic Unit

GLOSSARY (Continued)

FASP	Facility for Automated Software Production
FLIR	Forward-Looking Infrared
GRADS	Graphic Real-Time Application Display Support
HDS	Helmet Display System
HMD	Helmet Mounted Display
HOL	High Order Language
HOTAS	Hands-on-Throttle-and-Stick
HPS	Helmet Position Sensor
HUD	Head-Up Display
IAS	Indicated Airspeed
Ibus	Internal Bus
ICP	Integrated Control Panel
ICS	Integrated Control Set
IDS	Interface Design Specification
IEIS	Integrated Engine Instrument System
IFF	Identification Friend or Foe
ILS	Instrument Landing System
I/O	Input/Output
JTIDS	Joint Tactical Information Distribution System
LLLTV	Low Light Level Television
LSAD	Left Status Advisory Display
Mbus	MIDER Bus
MCP	Mode Control Panel
MIDER	Modular Integrated Display Electronics Rack
MFD	Multifunction Display

GLOSSARY (Continued)

MPICS	Microprocessor ICS
MPS	Mission Preparation System
NAV	Navigation
NAVAIRDEVCEN	Naval Air Development Center
NAVAIRINST	NAVAIR Instruction
NDRO	Non-Destructive Read-Out
NM	Nautical Mile
NTDS	Naval Tactical Data System
ODS	Operational Display Software
OSS	Operational Support Software
PDD	Program Design Document
PDS	Program Design Specification
PPS	Program Performance Specification
QA	Quality Assurance
RPM	Revolutions per Minute
RSAD	Right Status Advisory Display
RSG	Raster Symbol Generator
RT	Remote Terminal
SAD	Status Advisory Display
SADI	Standard AIDS Display Interface
SECNAVINST	Secretary of the Navy Instruction
SENSO	Sensor Operator
SOM	System Operator's Manual
SOSTEL	Solid State Electrical System
STO	Short Takeoff
STOL	Short Takeoff and Landing

GLOSSARY (Continued)

TACAN	Tactical Air Navigation
TACCO	Tactical Coordinator
TBD	To Be Determined
TD	Tactical Display
TIES	Tactical Information Exchange System
TOR	Tactical Operational Requirements
TP	Test Plan
TP/R	Test Procedures and Reports
TP/S	Test Plans and Specification
TR	Test Results
TS	Test Specification
UHF	Ultra High Frequency
ULAIDS	Universal Locator-Airborne Integrated Data System
Vbus	Video Bus
VHF	Very High Frequency
VSD	Vertical Situation Display
V/STOL	Vertical/Short Takeoff and Landing
Xbus	External Bus

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APPENDIX B

CONTROL ACTION/SYSTEM RESPONSE TABLES

*Indicates those control functions which are not available (invalid) at mode initialization.

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE

LEGEND: NONE (SYSTEM TURN ON)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: Automatic system test is initiated with power on. If SELF TEST is OK, "TEST PASS" is displayed on all displays. If SELF TEST fails, "TEST FAIL" is displayed on all displays. After self testing is complete "POWER ON" is displayed on all displays and functions shown below appear on MCP. BITE tape is read into the system when tape is inserted.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM
SELF TEST	4	System performs "self test" and displays "TEST PASS" or "TEST FAIL" on each display SELF TEST to SPD Area 1 Exit - PA	NONE									
TEST PATRN	5	Test pattern is displayed on each display TEST PATRN to SPD Area 1 Exit - PA	NONE									

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TABLE B-1, PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: PUSHLIGHT (MCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: "POWER ON" is displayed on all displays

(2ND LEVEL CONTROL) — columns 1–3; (3RD LEVEL CONTROL) — columns 4–6; (4TH LEVEL CONTROL) — columns 7–9; (5TH LEVEL CONTROL) — columns 10–12

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
INTRL INSP	1	Internal Inspection checklist format, displayed on HEAD. INTRL INSP to SPD Area 1 Exit - PA	NONE									
DATA ENTRY	2	Data Entry checklist (1st Sheet) format, displayed on HEAD. DATA ENTRY to SPD Area 1 Exit - PA	RNWAY DSTCE FIG. B-8	1	Cursor symbol displayed at "Runway Distance on checklist. "RNWAY DSTCE" to SPD Area 2.	INTEGER KEYSET ENABLED		Cueing message "RNWAY DSTCE" displayed on upper line of SPD data area. System checks validity of entered data and displays data on Data Entry Checklist format.	Return to 3rd level Control			
			RNWAY HEADG FIG. B-9	6	Cursor symbol displayed at "Runway Heading" on checklist. "RNWAY HEADG" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "RNWAY HEADG" displayed on upper line of SPD data area. System checks validity of entered data and displays data on Data Entry checklist format.	Return to 3rd level Control			
			TRUE WIND FIG B-10	11	Cursor symbol displayed at "True Wind" on checklist. "TRUE WIND" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "TRUE WIND" displayed on upper line of SPD data area. System checks validity of entered data and displays data on Data Entry checklist format.	Return to 3rd level Control			
			SLOPE FIG B-11	16	Cursor Symbol displayed at "SLOPE" on checklist. "SLOPE" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "SLOPE" displayed on upper line of SPD data area. System checks validity of entered data and displays data on Data Entry checklist format.	Return to 3rd level Control			
			GROSS WIGHT FIG B-12	21	Cursor symbol displayed at "GROSS WIGHT" on checklist. "GROSS WIGHT" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "GROSS WIGHT" displayed on upper line of SPD data area. System checks validity of entered data and displays data on DATA ENTRY checklist format.	Return to 3rd level Control			
			RNWAY TEMP FIG B-13	26	Cursor symbol displayed at "RNWAY TEMP" on checklist. "RNWAY TEMP" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "RNWAY TEMP" displayed on upper line of SPD data area. System checks validity of entered data and displays data on Data Entry checklist format.	Return to 3rd level Control			

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: PREFLIGHT (MCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: "POWER ON" is displayed on all displays

———(2ND LEVEL CONTROL)———

———(3RD LEVEL CONTROL)———

———(4TH LEVEL CONTROL)———

———(5TH LEVEL CONTROL)———

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
			TOLER OUT	24	OUT-OF-TOLERANCE SYMBOL (Arrow) displayed at far right of parameter format. Cursor Symbol advances to next parameter. Exit - PA	No Change						
			TOLER IN	25	IN-TOLERANCE SYMBOL (checkmark) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change						
			* BACK PAGE	29	Data Entry Checklist format returns (Backpage) to previously displayed set of data. This function is only valid if: a) Checklist is more than 1 page (format) long. b) "ADVAN PAGE" has been selected. Exit - PA	No Change						
			* ADVAN PAGE	30	Data Entry Checklist format advances (advance page) to the next set of data. This function is only valid if the checklist is more than 1 page (format) long. "BACK PAGE" - V Exit - PA	No Change						
ENG START	6	Engine Start checklist format displayed on RSAD. Engine Start format displayed on LSAD. "ENG START" to SPD Area 1 Completion of engine start validates "POST START" and invalidates "ENG START" Exit - PA	NONE									
* POST START	7	Post Start Checklist format Displayed on RSAD. Engine Monitor format displayed on LSAD. "POST START" to SPD Area 1 Exit - PA	NONE									

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: POSTFLIGHT (OCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: "POWER ON" is displayed on all displays

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONT'NL)

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
TEXT	13	Checklist displayed in "TEXT" format. This format can only be deselected by selection of "TEXT MONTR" or "MONTR". TEXT MONTR - BV Exit - PA	TEXT Legend goes out									
* TEXT MONTR	14	Checklist displayed in "TEXT MONTR" format. This format can only be deselected by selection of "TEXT" or "MONTR" Exit - PA	TEXT MONTR Legend goes out									
MONTR	15	Checklist displayed in "MONTR" format. This format can only be deselected by selection of "TEXT" or "TEXT MONTR". TEXT MONTR - BV Exit - PA	MONTR Legend goes out									
UMFD	4	Checklists displayed on UMFD RSAD-BV LSAD-V LMFD-V Exit- PA	UMFD Legend goes out									
LMFD	9	Checklists displayed on LMFD RSAD - BV UMFD - V LSAD - V Exit - PA	LMFD Legend goes out									
LSAD	8	Checklists displayed on LSAD RSAD - BV UMFD - V LMFD - V Exit - PA	LSAD Legend goes out									
* RSAD	10	Checklists displayed on RSAD UMFD - V LMFD - V LSAD - V Exit - PA	RSAD Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: PUSHLIGHT (ON:P) (1ST LEVEL CONTROL)

SYSTEM RESPONSE: "POWER ON" is displayed on all displays

(2ND LEVEL CONTROL) PUSH.LEG. RESP/STIM	LNC	SYSTEM RESPONSE	(3RD LEVEL CONTROL) PUSH. LEG. RESP/STIM	LNC	SYSTEM RESPONSE	(4TH LEVEL CONTROL) PUSH.LEG. RESP/STIM	LNC	SYSTEM RESPONSE	(5TH LEVEL CONTROL) PUSH. LEG. RESP/STIM	LNC	SYSTEM RESPONSE	PUSH.LEG. RESP/STIM
TOLER OUT	24	OUT-OF-TOLERANCE SYMBOL (arrow) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
TOLER IN	25	IN-TOLERANCE SYMBOL (check-mark) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
* BACK PAGE	29	Checklist format returns (backpages) to previously displayed set of data. This function is only valid if: a) Checklist is more than 1 page (format) long. b) "ADVAN PAGE" has been selected. Exit - PA	No Change									
* ADVAN PAGE	30	Checklist format advances (advance page) to the next set of data. This function is only valid if the checklist is more than 1 page (format) long. "BACK PAGE" - V Exit - PA	No Change									

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: TAXI (MCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HHD - Horizon Line & Heading Tape Format, HSD - Horizon Line & Bearing Marks Format, LEAD - Engine Monitor Format, MHFD- Pitch Ladder Format, LHFD - Text Format, READ - System Status Format.

(2ND LEVEL CONTROL)

(3RD LEVEL CONTROL)

(4TH LEVEL CONTROL)

(5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
TAXI	11	TAXI Checklist format displayed on READ. "TAXI" to SPD Area | Exit - PA	NONE									
MHFD	4	Checklist displayed on MHFD READ - BV LEAD - V LHFD - V Exit - PA	MHFD Legend goes out.									
LHFD	9	Checklist displayed on LHFD READ - BV MHFD - V LEAD - V Exit - PA	LHFD Legend goes out									
LEAD	8	Checklist displayed on LEAD READ - BV MHFD - V LHFD - V Exit - PA	LEAD Legend goes out									
• READ	10	Checklist displayed on READ MHFD - V LHFD - V LEAD - V Exit - PA	READ Legend goes out									
TEXT	13	Checklist displayed in "TEXT" format. This format can only be deselected by selection of "TEXT MONTR" or "MONTR". TEXT MONTR - BV Exit - PA	TEXT Legend goes out									
• TEXT MONTR	14	Checklist displayed in "TEXT MONTR" format. This format can only be deselected by selection of "TEXT" or "MONTR". Exit - PA	TEXT MONTR Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: TAXI (MCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HHD - Horizon Line & Heading Tape Format, HHB - Horizon Line & Bearing Marks Format, ESAD - Engine Monitor Format, PLFD - Pitch Ladder Format, TXFD - Taxi Format, SSAD - System Status Format.

— — — (2ND LEVEL CONTROL) — — —

— — — (3RD LEVEL CONTROL) — — —

— — — (4TH LEVEL CONTROL) — — —

— — — (5TH LEVEL CONTROL) — — —

PUSH.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH.LEG. RESP/STIM
MONTR	15	Checklist displayed in "MONTR" format. This format can only be deselected by selection of "TEXT" or "TEXT MONTR". TEXT MONTR - PU Exit - PA	MONTR Legend goes out									
TOLER OUT	24	OUT-OF-TOLERANCE Symbol (Arrow) Displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
TOLER IN	25	IN-TOLERANCE Symbol (check-mark) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
* BACK PAGE	29	Checklist format returns (backpages) to previously displayed set of data. This function is only valid if; a) Checklist is more than 1 page (format) long. b) "ADVAN PAGE" has been selected. Exit - PA	No Change									
* ADVAN PAGE	30	Checklist format advances (Advance Page) to the next set of data. This function is only valid if the check-list is more than 1 page (format) long. "BACK PAGE" - V Exit - PA	No Change									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: CTO (HCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HUD - Take off format, HUD-Pitch Ladder format,
LSAD - Engine Monitoring format, UMFD - Pitch Ladder format,
LMFD - Taxiway format, RSAD - System Status format,

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

FUNC. LEG. RESP/STIM	LAC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LAC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LAC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LAC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM
CTO CKLST	16	CTO Checklist format displayed on RSAD, "CTO CKLST" - to UFD Area 1 Exit - PA	NONE									
UMFD	4	Checklist displayed on UMFD RSAD - BV LSAD - V LMFD - V Exit - PA	UMFD Legend goes out									
LMFD	9	Checklist displayed on LMFD RSAD - BV UMFD - V LSAD - V Exit - PA	LMFD Legend goes out									
LSAD	6	Checklist displayed on LSAD. RSAD - BV UMFD - V LMFD - V Exit - PA	LSAD Legend goes out									
*RSAD	10	Checklist displayed on RSAD. UMFD - V LMFD - V LSAD - V Exit - PA	RSAD Legend goes out									
TEXT	13	Checklist displayed in "TEXT" format. This format can only be deselected by selection of "TEXT [illegible]" or "[illegible]". TEXT [illegible] - BV Exit - PA	TEXT Legend goes out									
* TEXT [illegible]	14	Checklist displayed in "TEXT [illegible]" format. This format can only be deselected by selection of "TEXT" or "[illegible]" Exit - PA	TEXT [illegible] Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: CTD (MCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: TOFD - Takeoff format, PLOD - Pitch Ladder format,
LEAD - Engine Monitoring format, UNFD - Pitch Ladder format,
LNFD - Taxiway format, SSAD - System Status format,

— — — (2ND LEVEL CONTROL) — — —
— — — (3RD LEVEL CONTROL) — — —
— — — (4TH LEVEL CONTROL) — — —
— — — (5TH LEVEL CONTROL) — — —

PROG.LBL. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LBL. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LBL. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LBL. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LBL. RESP/STIM
MONTR	15	Checklist displayed in "MONTR" format. This format can only be deselected by selection of "TEXT" or "TEXT MONTR". TEXT MONTR - DU Exit - PA	MONTR Legend goes out									
TOLER OUT	24	OUT-OF-TOLERANCE Symbol (Arrow) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
TOLER IN	25	IN-TOLERANCE Symbol (check-mark) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
• BACK PAGE	29	Checklist format returns (backpages) to previously displayed set of data. This function is only valid if: a) checklist is more than 1 page (format) long. b) "ADVAN PAGE" has been selected. Exit - PA	No Change									
• ADVAN PAGE	30	Checklist format advances (Advance Page) to the next set of data. This function is only valid if the checklist is more than 1 page (format) long. "BACK PAGE" - V Exit - PA	No Change									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: STD (OCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: RMFD - Takeoff format, HUD - Pitch Ladder format, LSAD - Engine Monitoring format, RMFD - Pitch Ladder format, LMFD - Taxi way format, RSAD - System Status format.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

FUNC.LOC. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LOC. RESP/STIM
STD CHKLST FIG. B-21	17	STD checklist format displayed on RSAD. "STD CHKLST" to HUD Area 1. Exit - PA	NONE									
RMFD	4	Checklist displayed on RMFD RSAD - DV LSAD - V LMFD - V Exit - PA	RMFD Legend goes out									
LMFD	9	Checklist displayed on LMFD RSAD - DV RMFD - V LSAD - V Exit - PA	LMFD Legend goes out									
LSAD	8	Checklist displayed on LSAD RSAD - DV RMFD - V LMFD - V Exit - PA	LSAD Legend goes out									
• RSAD	16	Checklist displayed on RSAD RMFD - V LMFD - V LSAD - V Exit - PA	RSAD Legend goes out									
TEXT	17	Checklist displayed in "TEXT" format. This format can only be deselected by selection of "TEXT MONTR" or "MONTR". TEXT MONTR - DV Exit - PA	TEXT Legend goes out									
• TEXT MONTR	14	Checklist displayed in "TEXT MONTR" format. This format can only be deselected by selection of "TEXT" or "MONTR". Exit - PA	TEXT MONTR Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

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LEGEND: STD (ACP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: TOFD - Takeoff format, LEAD - Engine Monitoring format, LNFD - Taxiway format, HNFD - Pitch Ladder format, NAFD - Pitch Ladder format, SEAD - System Status format.

— — — (2ND LEVEL CONTROL) — — —

— — — (3RD LEVEL CONTROL) — — —

— — — (4TH LEVEL CONTROL) — — —

— — — (5TH LEVEL CONTROL) — — —

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
MONITR	15	Checklist Displayed in "MONITR" format. This format can only be deselected by selection of "TEXT" or "TEXT MONITR". TEXT MONITR - DV Exit - PA	MONITR Legend goes out									
TOLER OUT	24	OUT-OF-TOLERANCE symbol (Arrow) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No change									
TOLER IN	25	IN-TOLERANCE symbol (check-mark) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
• BACK PAGE	29	Checklist format returns (backpages) to previously displayed set of data. This function is only valid if: a) Checklist is more than 1 page (format) long. b) "ADVAN PAGE" has been selected. Exit - PA	No Change									
• ADVAN PAGE	30	Checklist format advances (Advance Page) to the next set of data. This function is only valid if the checklist is more than 1 page (format) long. "BACK PAGE" - V Exit - PA	No Change									

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: VTO (MCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: TOD - Takeoff format, LSAD - Engine Monitoring format, LMFD - Taxiway format, RMD - Pitch Ladder format, RMFD - Pitch Ladder format, RSAD - System Status format.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
VTO CKLST	23	VTO checklist format displayed on RSAD. "VTO CKLST" to OFF. Area 1 Exit - PA	NONE									
RMFD	6	Checklist displayed on RMFD RSAD - BV LSAD - V LMFD - V Exit - PA	RMFD Legend goes out									
LMFD	9	Checklist displayed on LMFD RSAD - BV RMFD - V LSAD - V Exit - PA	LMFD Legend goes out									
LSAD	8	Checklist displayed on LSAD RSAD - BV RMFD - V LMFD - V Exit - PA	LSAD Legend goes out									
* RSAD	10	Checklist displayed on RSAD RMFD - V LMFD - V LSAD - V Exit - PA	RSAD Legend goes out									
TEXT	13	Checklist displayed in "TEXT" format. This format can only be deselected by selection of "TEXT MONTR" or "MONTR". TEXT MONTR - BV Exit - PA	TEXT Legend Goes out									
* TEXT MONTR	14	Checklist displayed in "TEXT MONTR" format. This format can only be deselected by selection of "TEXT" or "MONTR" Exit - PA	TEXT MONTR Legend goes out									

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TABLE B-1, PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: VSD (MCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: TMD - Takeoff format, PMD - Pitch Ladder format,
EMAD - Engine Monitoring format, PMFD - Pitch Ladder format,
TNFD - Trajectory format, SSAD - System Status format.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
MONTR	15	Checklist Displayed in "MONTR" format. This format can only be deselected by selection of "TEST" or "TEST MONTR". TEST MONTR - BV Exit - PA	MONTR Legend goes out									
TOLER OUT	24	OUT-OF-TOLERANCE symbol (Arrow) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
TOLER IN	25	IN-TOLERANCE Symbol (check-mark) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
* BACK PAGE	29	Checklist format returns (backpages) to previously displayed set of data. This function is only valid if: a) checklist is more than 1 page (format) long. b) "ADVAN PAGE" has been selected. Exit - PA	NO Change									
* ADVAN PAGE	30	Checklist format advances (Advance Page) to the next set of data. This function is only valid if the checklist is more than 1 page (format) long. "BACK PAGE" - V Exit - PA	No Change									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: CLIMB (HCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: [illegible] - Takeoff format, [illegible] - Pitch Ladder format,
LSAD - Engine Monitoring format, UMFD - Pitch Ladder format,
LMFD - Flight Plan & Compass Rose format, RSAD - System Status format,

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
TIME CLIMB	1	Time Climb Format, Fig. displayed on RSAD. "TIME CLIMB" to SPD Area 1 Exit - FA	NONE									
FUEL CLIMB	2	Fuel Climb Format, displayed on RSAD. "FUEL CLIMB" to SPD Area 1 Exit - FA	NONE									
UMFD	4	Checklist displayed on UMFD RSAD - BV LSAD - V LMFD - V Exit - FA	UMFD Legend goes out									
LMFD	9	Checklist displayed on LMFD RSAD - BV UMFD - V LSAD - V Exit - FA	LMFD Legend goes out									
LSAD	8	Checklist displayed on LSAD RSAD - BV UMFD - V LMFD - V Exit - FA	LSAD Legend goes out									
• RSAD	10	Checklist displayed on RSAD UMFD - V LMFD - V LSAD - V Exit - FA	RSAD Legend goes out									

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TABLE B-1. PILOT CONTROL ..CTION/SYSTEM REFERENCE (Continued)

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LEGEND: CRUISE (MCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: (When a predetermined altitude is reached or when the pilot selects "CRUISE" on the MCP) HUD - Cruise format,
HHD - Horizon line format, LEAD - Engine Monitoring format,
RHFD - Pitch Ladder format, LHFD - Flight Plan & Compass Rose format
RLAD - System Status format.

(2ND LEVEL CONTROL)

(3RD LEVEL CONTROL)

(4TH LEVEL CONTROL)

(5TH LEVEL CONTROL)

PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: SEARCH (ACP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HMD - Cruise format, HMD - Pitch Ladder format,
LSAD-Engine Monitoring format, HMFD - Pitch Ladder format,
HMFD- Flight Plan and Compass Rose format,
RSAD - System Status format,

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
WAYPT DESIG	6	Display valid waypoint I.D.'s on RSAD. Enable FTS, "WAYPT DESIG" to SPD Area 1. When designate signal is received from HFS (TAS switch) display next valid waypoint I.D. & LOS AZ and EL on HMD. When enter signal is received from HFS (TAS switch) store waypoint I.D., surface position and entry time - display on HMD. Exit - PA	NONE									
WAYPT VISUAL	7	Set up for visual sighting of stored waypoint. "WAYPT VISUAL" to SPD Area 1	INTEGER KEYSET ENABLED		Cueing message "WAYPT NO." displayed on upper line of SPD data area. After receipt of entered Waypoint I. D. display cue arrow on HMD to position LOS for visual sighting of Waypoint. Exit - PA	NONE						
WAYPT ADD	11	WAYPT TABULATION format Displayed on RSAD. "WAYPT ADD" to SPD Area 1	A) LAT KEYSET ENABLED B) LONG KEYSET ENABLED		Cueing message appears on upper line of SPD data area. System validates, accepts, and assigns next valid waypoint ID to entered data. Order of entry is: A) "LAT" B) "LONG" Entered Waypoint is displayed on WAYPT TABULATION format and on Flight Plan format.	Return to 2nd level Control						
WAYPT DELET	12	WAYPT TABULATION format, displayed on RSAD. "WAYPT DELET" to SPD Area 1	INTEGER KEYSET ENABLED		Cueing message "WAYPT NO." displayed on upper line of SPD data area. System validates, accepts and deletes from memory entered Waypoint. Waypoint is deleted from WAYPT TABULATION format and Flight Plan format. Exit - PA	NONE						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: SEARCH (HCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HMD - Cueing format. HUD - Pitch Ladder format,
LSAD - Engine Monitoring format, RMFD - Pitch Ladder format,
LMFD - Flight Plan and Compass Rose format,
RSAD - System Status format,

— — — (2ND LEVEL CONTROL) — — —
— — — (3RD LEVEL CONTROL) — — —
— — — (4TH LEVEL CONTROL) — — —
— — — (5TH LEVEL CONTROL) — — —

PROG.LEG. RESP/STIM	LNC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LNC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LNC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LNC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
RMFD	4	Waypoint formats displayed on RMFD RSAD - SV LSAD - V LMFD - V Exit - PA	RMFD Legend goes out									
LMFD	9	Waypoint formats displayed on LMFD RSAD - SV RMFD - V LSAD - V Exit - PA	LMFD Legend goes out									
LSAD	8	Waypoint formats displayed on LSAD RSAD - SV RMFD - V LMFD - V Exit - PA	LSAD Legend goes out									
* RSAD	10	Waypoint formats displayed on RSAD RMFD - V LMFD - V LSAD - V Exit - PA	RSAD Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: CL (OCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HUD Land format, HHD - Pitch Ladder format, LSAD - Engine Monitoring format, RMFD - Pitch Ladder format, LMFD - Taxiway format, RSAD - System Status format.

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PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE (2ND LEVEL CONTROL)	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE (3RD LEVEL CONTROL)	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE (4TH LEVEL CONTROL)	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE (5TH LEVEL CONTROL)	PROG. LEG. RESP/STIM
PRLND DSCNT	21	Preland/Descent checklist format displayed on RSAD "PRLND DSCNT" to SPD Area 1 Exit - PA	NONE									
CL	26	Conventional Landing checklist format displayed on RSAD. "CL" to SPD Area 1 Exit - PA	NONE									
RMFD	4	Checklist displayed on RMFD RSAD - DV LSAD - V LMFD - V Exit - PA	RMFD Legend goes out									
LMFD	9	Checklist displayed on LMFD RSAD - DV RMFD - V LSAD - V Exit - PA	LMFD Legend goes out									
LSAD	8	Checklist displayed on LSAD RSAD - DV RMFD - V LMFD - V Exit - PA	LSAD Legend goes out									
* RSAD	10	Checklist displayed on RSAD RMFD - V LMFD - V LSAD - V Exit - PA	RSAD Legend goes out									
TEXT	13	Checklist displayed in "TEXT" format. This format can only be deselected by selection of "TEXT MONTR" or "MONTR". TEXT MONTR - DV Exit - PA	TEXT Legend goes out									

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: CL (MCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HUD - Land format, HUD - Pitch Ladder format, LEAR - Engine Monitoring format, HWFB - Pitch Ladder format, LWFB - Taxiway format, SSAP - System Status format,

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PNG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PNG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PNG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PNG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PNG. LEG. RESP/STIM
* TEXT MONTR	14	Checklist displayed in "TEXT MONTR" format. This format can only be deselected by selection of "TEXT" or "MONTR". Exit - PA	TEXT MONTR Legend goes out									
MONTR	15	Checklist displayed in "MONTR" format. This format can only be deselected by selection of "TEXT" or "TEXT MONTR". TEXT MONTR - IW Exit - PA	MONTR Legend goes out									
TOLER OUT	34	OUT-OF-TOLERANCE symbol (arrow) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
TOLER IN	35	IN-TOLERANCE Symbol (checkmark) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
* BACK PAGE	29	Checklist format returns (backpages) to previously displayed set of data. This function is only valid if: a) Checklist is more than 1 page (format) long. b) "ADVAN PAGE has been selected. Exit - PA	No Change									
* ADVAN PAGE	30	Checklist format advances (Advance Page) to the next set of data. This function is only valid if the checklist is more than 1 page (format) long. "BACK PAGE" - V Exit - PA	No Change									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

SCREEN: SL (MCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSES: HUD - Land format, HUD - Pitch Ladder format,
LSAD - Engine Monitoring format, RMFD - Pitch Ladder format,
LMFD - Taxiway format, RSAD - System Status format.

(2ND LEVEL CONTROL) (3RD LEVEL CONTROL) (4TH LEVEL CONTROL) (5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
PRLND RECHK	21	Preland/Rev of checklist format displayed on RSAD. "PRLND RECHK" to SFD Area 1 Exit - PA	NONE									
SL	27	Short Landing checklist format displayed on RSAD. "SL" to SFD Area 1 Exit - PA	NONE									
RMFD	6	Checklist displayed on RMFD RSAD - BV LSAD - V LMFD - V Exit - PA	RMFD Legend goes out									
LMFD	9	Checklist displayed on LMFD RSAD - BV RMFD - V LSAD - V Exit - PA	LMFD Legend goes out									
LSAD	8	Checklist Displayed on LSAD RSAD - BV RMFD - V LMFD - V Exit - PA	LSAD Legend goes out									
* RSAD	10	Checklist displayed on RSAD RMFD - V LMFD - V LSAD - V Exit - PA	RSAD Legend goes out									
TEXT	13	Checklist displayed in "TEXT" format. This format can only be deselected by selection of "TEXT MONTR" or "MONTR". TEXT MONTR - BV Exit - PA	TEXT Legend goes out									

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TABLE B-1. PILOT CONTROL/ CTION/SYSTEM REFERENCE (Continued)

LEGEND: SL (ACP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HUD - Land format, Pitch Ladder format,
LEAD - Engine Monitoring format; HMFD - Pitch Ladder format;
HMFD - Taxiway format; RSAP - System status format.

(2ND LEVEL CONTROL)

(3RD LEVEL CONTROL)

(4TH LEVEL CONTROL)

(5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
* TEXT MONTR	14	Checklist displayed in "TEXT MONTR" format. This format can only be deselected by selection of "TEXT" or "MONTR". Exit - PA	TEXT MONTR Legend goes out									
MONTR	15	Checklist displayed in "MONTR" format. This format can only be deselected by selection of "TEXT" or "TEXT MONTR". TEXT MONTR - SV Exit - PA	MONTR Legend goes out									
TOLER OUT	36	OUT-OF-TOLERANCE symbol (Arrow) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
TOLER IN	25	IN-TOLERANCE Symbol (Check-mark) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No Change									
* BACK PAGE	29	Checklist format returns (backpages) to previously displayed set of data. This function is only valid if: a) Checklist is more than 1 page (format) long. b) "ADVAN PAGE" has been selected. Exit - PA	No Change									
* ADVAN PAGE	30	Checklist format advances (Advance Page) to the next set of data. This function is only valid if the checklist is more than 1 page (format) long. "BACK PAGE" - V Exit - PA	No Change									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: VL (MCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: RMD - Land format, LSAD - Engine Monitoring format, LMFD - Tanker format, RMD - Pitch Ladder format, RMFD - Pitch Ladder format, RSAD - System Status format,

— — — (2ND LEVEL CONTROL) — — —

— — — (3RD LEVEL CONTROL) — — —

— — — (4TH LEVEL CONTROL) — — —

— — — (5TH LEVEL CONTROL) — — —

PROG.LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
PRLND DSCNT	21	Prelnd/Descent checklist format displayed on RSAD. "PRLND DSCNT" to EFD Area 1 Exit - PA	NONE									
VL	20	Vertical Landing checklist format displayed on RSAD. "VL" to EFD Area 1 Exit - PA	NONE									
RMFD	4	Checklist displayed on RMFD RSAD - DV LSAD - V LMFD - V Exit - PA	RMFD Legend goes out									
LMFD	9	Checklist displayed on LMFD RSAD - DV RMFD - V LSAD - V Exit - PA	LMFD Legend goes out									
LSAD	8	Checklist displayed on LSAD RSAD - DV RMFD - V LMFD - V Exit - PA	LSAD Legend goes out									
* RSAD	10	Checklist displayed on RSAD RMFD - V LMFD - V LSAD - V Exit - PA	RSAD Legend goes out									
TEXT	13	Checklist displayed in "TEXT" format. This format can only be deselected by selection of "TEXT MONTR" or "MONTR". TEXT MONTR - DV Exit - PA	TEXT Legend goes out									
* TEXT MONTR	14	Checklist displayed in "TEXT MONTR" format. This format can only be deselected by selection of "TEXT" or "MONTR" Exit - PA	TEXT MONTR Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: VI (HCP)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HMD - Land format, LEAD - Engine Monitoring format, LHFD - Taxiway format, HMD - Pitch Ladder format, HMFD - Pitch Ladder format, SSAD - System Status format,

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
MONTR	15	Checklist displayed in "MONTR" format. This format can only be deselected by selection of "TEST" or "TEST MONTR". TEST MONTR - W Exit - PA	MONTR Legend goes out									
TOLER OUT	24	OUT-OF-TOLERANCE symbol (Arrow) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	NO CHANGE									
TOLER IN	25	IN-TOLERANCE symbol (checkmark) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	NO CHANGE									
* BACK PAGE	29	Checklist format returns (backpages) to previously displayed set of data. This function is only valid if: a) Checklist is more than 1 page (format) long. b) "ADVAN PAGE" has been selected. Exit - PA	NO CHANGE									
* ADVAN PAGE	30	Checklist format advances (Advance Page) to the next set of data. This function is only valid if the checklist is more than 1 page (format) long. "BACK PAGE" - V Exit - PA	NO CHANGE									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: COMM (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: COMM STATUS Format, is displayed on BSAD.
All other displays remain as they were.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
UHF 1	1	"UHF 1" to SPD Area 1 Exit - PA	ON	1	ON - Apply Power to UHF 1 Radio All other functions - V Exit - PA	ON Legend goes out						
			OFF		OFF - Remove Power from UHF 1 Radio ON - NV All other functions - 1	OFF Legend goes out, return to 2nd level control						
			VOLME	3	ICP Control of UHF 1 volume. "VOLME" to SPD Area 2 Exit - PA	Force-stick enabled	31	Send volume setting to UHF 1 Radio Exit - PA	NONE			
			SQLCH	4	ICP Control of UHF 1 squelch "SQLCH" to SPD Area 2 Exit - PA	Force-stick enabled	31	Send Squelch setting to UHF 1 Radio Exit - PA	NONE			
			TONE	5	ICP Control of UHF 1 tone. "TONE" to SPD Area 2 Exit - PA	Force-stick enabled	31	Send tone setting to UHF 1 Radio Exit - PA	NONE			
			ANTNA	6	"ANTNA" to SPD Area 2 Exit - PA	UPPER	1	Assign UHF 1 radio to upper antenna. "UPPER" to SPD Area 3	Return to 2nd level control			
						LOWER	6	Assign UHF 1 radio to lower antenna. "LOWER" to SPD Area 3	Return to 2nd level control			
			CHANL SELCT	16	Channel Assignment format, for UHF 1 is displayed on BSAD "CHANL SELCT" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "CHANL" appears in upper line of SPD data area. System checks validity of entered channel no. and sends channel selection to UHF 1 radio. System sends acknowledge message (reverse polarity) that action is complete. Channel Assignment format is updated.	Return to 2nd level Control			

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: COMM (SCP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: COMM STATUS format, is displayed on RSAD. All other displays remain as they were.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
UHF 1 (cont'd)			CHANL FREQ	17	Channel Assignment format, for UHF 1 is displayed on RSAD. "CHANL FREQ" to SFD Area 2	INTEGER KEYSET ENABLED DECIMAL KEYSET Enabled		(A) Cueing message "CHANL" appears in upper line of SFD data area. System checks validity and accepts entered channel no. (B) Cueing message "FREQ" appears in upper line of SFD data area. System checks validity and accepts entered frequency. Channel ID & Frequency are sent to UHF 1 Radio. System sends acknowledge message (reverse polarity) that action is complete. Channel Assignment format is updated.	Return to 2nd level Control			
			FREQ	26	Channel Assignment format, for UHF 1 is displayed on RSAD. "FREQ" to SFD Area 2	DECIMAL KEYSET Enabled		Cueing message "FREQ" appears in upper line of SFD data area. System checks validity and accepts entered frequency. Frequency is sent to UHF 1 radio. System sends acknowledge message (reverse polarity) that action is complete. Present frequency notation on RSAD & LMFD is updated.	Return to 2nd level Control			
UHF 2	6	"UHF 2" to SFD Area 1 Exit - PA	* ON	1	ON - Apply power to UHF 2 radio. All other functions - V Exit - PA	ON Legend goes out						
			OFF		OFF - Remove power from UHF 2 radio. ON - DV All other functions - 1	OFF Legend goes out. Return to 2nd level Control						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: COMM (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: COMM STATUS format, is displayed on READ. All other displays remain as they were.

(2ND LEVEL CONTROL) PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	(3RD LEVEL CONTROL) PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	(4TH LEVEL CONTROL) PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	(5TH LEVEL CONT'RL) PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
UHF 2 (cont'd)			VOLME	3	ICP Control of UHF 2 volume. "VOLME" to SPD Area 2 Exit - PA	Force-stick enabled	31	Send volume setting to UHF 2 Radio Exit - PA	NONE			
			SQLCH	4	ICP Control of UHF 2 squelch. "SQLCH" to SPD Area 2 Exit - PA	Force-stick enabled	31	Send squelch setting to UHF 2 Radio. Exit - PA	NONE			
			TONE	5	ICP Control of UHF 2 tone. "TONE" to SPD Area 2 Exit - PA	Force-stick enabled	31	Send tone setting to UHF 2 Radio. Exit - PA	NONE			
			ANTNA	6	"ANTNA" to SPD Area 2 Exit - PA	UPPER	1	Assign UHF 2 radio to upper antenna. "UPPER" to SPD Area 3	Return to 2nd level control			
						LOWER	6	Assign UHF 2 radio to lower antenna. "LOWER" to SPD Area 3	Return to 2nd Level Control			
			CHANL SELCT	16	Channel Assignment format, for UHF 2 is displayed on READ. "CHANL SELCT" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "CHANL" appears in upper line of SPD data area. System Checks validity of entered channel no. and sends channel selection to UHF 2 radio. System sends acknowledge message (reverse polarity) that action is complete. Channel Assignment format is updated	Return to 2nd level Control			
			CHANL FREQ	17	Channel Assignment format, for UHF 2 is displayed on READ. "CHANL FREQ" to SPD Area 2	INTEGER KEYSET ENABLED DECIMAL KEYSET Enabled		(A) Cueing message "CHANL" appears in upper line of SPD data area. System checks validity and accepts entered channel no. (B) Cueing message "FREQ" appears in upper line of SPD data area. System checks validity and accepts entered frequency. Channel No. & Frequency are sent to UHF 2 Radio. System sends acknowledge message (reverse polarity) that action is complete. Channel Assignment format is updated.	Return to 2nd level Control			

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TABLE B-1, PILOT CONTROL/—TION/SYSTEM REFERENCE (Continued)

LEGEND: COMM (3CP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: COMM STATUS format, is displayed on RSAD. All other displays remain as they were.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LAC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LAC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LAC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LAC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
UHF 2 (cont'd)			FREQ	24	Channel Assignment format, ... for UHF 2 is displayed on RSAD. "FREQ" to SPD Area 2	DECIMAL KEYSET Enabled		Cueing message "FREQ" appears in upper line of SPD data area. System checks validity and accepts entered frequency. Frequency is sent to UHF 2 radio. System sends acknowledge message (reverse polarity) that action is complete. Present frequency notation on RSAD & LMFD is updated.	Return to 2nd level Control			
RADAR BEACON	31	"RADAR BEACON" to SPD Area 1 Unit - PA	ON / OFF	1	ON - Apply power to Radar Beacon. All other functions - V Unit - PA	ON Legend goes out						
					OFF - Remove power from radar Beacon. ON - DV All other functions - V	OFF Legend goes out. Return to 2nd level control						
			STDBY	6	Disable Radar Beacon "STDBY" to SPD Area 3	Return to 2nd level Control						
			SNGLE	11	Set single pulse response to interrogation. "SNGLE" to SPD Area 3	Return to 2nd level Control						
			DUBLE	16	Set double pulse response to interrogation. "DUBLE" to SPD Area 3	Return to 2nd level Control						
RMFD	4	COMM format displayed on RMFD RSAD - DV LSAD - V LMFD - V Unit - PA	RMFD Legend goes out									
LMFD	9	COMM format displayed on LMFD RSAD - DV RMFD - V LSAD - V Unit - PA	LMFD Legend goes out									

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: COMM (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: COMM STATUS format, is displayed
on RSAD. All other displays remain as they were.

(2ND LEVEL CONTROL)				(3RD LEVEL CONTROL)			(4TH LEVEL CONTROL)			(5TH LEVEL CONTROL)		
PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
LSAD	9	COMM format displayed on LSAD RSAD - BV RMFD - V LMFD - V Exit - PA	LSAD Legend goes out									
* RSAD	10	COMM format displayed on RSAD RMFD - V LMFD - V LSAD - V Exit - PA	RSAD Legend goes out									

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TABLE B-1. PILOT CONTROL/[illegible]TION/SYSTEM REFERENCE (Continued)

LEGEND: NAV (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: EHSI format, is displayed on LMFD.
All other displays will remain as they were.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
INS	1	"INS" to SPD Area 1 Exit - PA	* ON	1	ON - Apply power to INS All other functions - [illegible] Exit - PA	ON Legend goes out						
			OFF		OFF - Remove power from INS ON - SV All other functions - [illegible]	OFF Legend goes out. Return to 2nd level control						
			GROUND ALIGN	6	Allows alignment of platform for shore based aircraft "GROUND ALIGN" to SPD Area 2	(A) LAT KEYSET Enabled (B) LONG KEYSET ENABLED		(A) Cueing message "LAT" appears on upper line of scratch pad data area. System accepts and validates latitude entry. (B) Cueing message "LONG" appears on upper line of scratch pad data area. System accepts and validates longitude. System sends acknowledge message (reverse polarity) that action is complete. Entered data is displayed on EHSI format.	Return to 2nd level Control			
			CAINS	1	Allows alignment of platform for carrier based aircraft "CAINS" to SPD Area 2	(A) LAT KEYSET Enabled (B) LONG KEYSET ENABLED (C) DECIMAL KEYSET ENABLED (D) HEADING KEYSET ENABLED		Cueing message appears on upper line of scratch pad data area. System accepts and validates entry. Entries in order are: (A) "LAT" (B) "LONG" (C) "SPEED" (D) "HEADG" System sends acknowledge message (reverse polarity) that action is complete. Entered data is displayed on EHSI format.	Return to 2nd Level Control			

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: NAV (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: EHSI format, is displayed on LMFD.
All other displays will remain as they were.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
INS (cont'd)			* INS SELCT	16	Selects INS Navigation, this legend is valid only when platform has been aligned and ICP has received an enabling feedback from the system. "INS SELCT" to SFD Area 2	Return to 2nd level Control						
			INS/AH	31	Selects quick alignment mode for platform "INS/AH" to SFD Area 2	HEADING KEYSET ENABLED		Cueing message "HEADG" appears on upper line of SFD data area. System validates, accepts, and sends acknowledge message (reverse polarity) that action is complete. Data is displayed on EHSI format.	Return to 2nd level control			
			DATA LINK	26	Allows alignment of platform for airborne aircraft. "DATA LINK" to SFD Area 2	Return to 2nd level Control						
TACAN	2	"TACAN" to SFD Area 1 Exit - FA	VOLME	3	ICP Control of TACAN volume. "VOLME" to SFD Area 2	Force-pick enabled	31	System sends volume change commands to change audio level of TACAN station in pilot's headset Exit - FA	NONE			
			BEARG	6	Bearing info only from TACAN Station. "BEARG to SFD Area 2	Return to 2nd level Control						
			BEARG RANGE	7	Bearing and slant range data from TACAN station "BEARG RANGE" to SFD Area 2	Return to 2nd level Control						
			CHANL	14	"CHANL" to SFD Area 2	TACAN KEYSET Enabled		Cueing message "CHANL" appears on upper line of SFD data area. System validates, accepts and sends acknowledge message (reverse polarity) that action is complete. Selected TACAN Channel is set and EHSI format updated.	Return to 2nd level Control			

TABLE B-1. PILOT CONTROL/A ION/SYSTEM REFERENCE (Continued)

LEGEND: NAV (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: EHSI Format. is displayed on LMFD
All other displays will remain as they were.

—(2ND LEVEL CONTROL)—
—(3RD LEVEL CONTROL)—
—(4TH LEVEL CONTROL)—
—(5TH LEVEL CONTROL)—

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
RADAR ALT	5	"RADAR ALT" to SPD Area 1 Exit - PA	INTEGER KEYSET ENABLED		Cueing message "LOW ALT" appears in upper line of SPD data area. System checks validity and accepts LOW altitude warning entry. System sends acknowledge message (reverse polarity) that action is complete.	Return to 2nd level Control						
NAV UPDTE	11	"NAV UPDTE" to SPD Area 1 Exit - PA	TACAN FIX	1	Prepares system for updating of NAV info using TACAN. "TACAN FIX" to SPD Area 2.	A TACAN KEYSET Enabled B INTEGER KEYSET ENABLED		A Cueing message "CHANL" appears on upper line of SPD data area. System checks validity of entered TACAN channel no. B Cueing message "WAYPT" appears on upper line of SPD data area. System checks validity and accepts entered waypoint for update. System sends acknowledge message (reverse polarity) that action is complete. Position is updated on EHSI format.	Return to 2nd level Control			
			VISUL FIX	11	Prepares system for updating using visual sighting by pilot. "VISUL FIX" to SPD Area 2	DESIGNATE KEYSET Enabled		Cueing message "WAYPT" appears on upper line of SPD data area. System checks validity and accepts waypoint to be updated. System sends acknowledge message (reverse polarity) that action is complete. "DESIGNATE KEYSET" goes out. Validates "DESIG".	DESIG		When plane is directly over designated waypoint, "DESIG" is selected, system visual fix data, is entered for waypoint. Updated waypoint is displayed on EHSI format.	Return to 2nd level control
			RADAR FIX	21	Prepares system for navigation update using radar fix of waypoint. "RADAR FIX" to SPD Area 2.	INTEGER KEYSET ENABLED		Cueing message "WAYPT" appears on upper line of SPD data area. System checks validity and accepts waypoint entry. System sends acknowledge message (reverse polarity) that action is complete. Waypoint is updated by radar fix. Updated waypoint is displayed on EHSI.	Return to 2nd level Control			

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: NAV (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HSI format, is displayed on LMFD.
All other displays will remain as they were.

— — — (2ND LEVEL CONTROL) — — — — (3RD LEVEL CONTROL) — — — — (4TH LEVEL CONTROL) — — — — (5TH LEVEL CONTROL) — — —

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
TACTL DATA	12	"TACTL DATA" to SPD Area 1 Exit - PA	CHKPT	1	Checkpoint Assignment format, displayed on HSAD. "CHKPT" to SPD Area 2	(A) INTEGER KEYSET ENABLED (B) LAT KEYSET ENABLED (C) LONG KEYSET ENABLED		(A) Cueing message "CHKPT" appears on upper line of SPD data area. System checks validity of entered checkpoint no. (B) Cueing message "LAT" appears on upper line of SPD data area. System accepts and validates latitude entry. (C) Cueing message "LONG" appears on upper line of SPD data area. System accepts and validates longitude entry. Entered data is stored in system. System sends acknowledge message (reverse polarity) that action is complete. Checkpoint is displayed on HSI format and checkpoint Assignment format.	Return to 2nd level Control			
			WAYPT	6	Waypoint Assignment format, displayed on HSAD. "WAYPT" to SPD Area 2	(A) INTEGER KEYSET ENABLED (B) LAT KEYSET ENABLED (C) LONG KEYSET ENABLED		(A) Cueing message "WAYPT" appears on upper line of SPD data area. System checks validity of entered checkpoint no. (B) Cueing message "LAT" appears on upper line of SPD data area. System accepts and validates latitude entry. (C) Cueing message "LONG" appears on upper line of SPD data area. System accepts and validates longitude entry. Entered data is stored in system. System sends acknowledge message (reverse polarity) that action is complete. Checkpoint is displayed on HSI format and Waypoint assignment format.	Return to 2nd level control			

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: NAV (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HSI format, : is displayed on LMFD
All other displays will remain as they were.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONT'ND.)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
FORMT SELCT	26	"FORMT SELCT" to SPD Area 1 Exit - PA	HSI	1	HSI format displayed on currently selected NAV display. "HSI" to SPD Area 2	Return to 2nd level Control						
			CMPAS	6	Compass rose format, track up A/C centered, 50 mi. scale - displayed on currently selected NAV display. "CMPAS" to SPD Area 2	TRACK UP	8	Change format to Track up. Validates "NORTH UP" Exit - PA	Track up Legend goes out			
						NORTH UP		Change format to North Up. Validates - "TRACK UP" Exit - PA	NORTH UP Legend goes out			
						MAP	11	Adds map to compass format VALIDATES - "MAP DELET" Exit - PA	MAP Legend goes out			
						MAP DELET		Deletes map from compass format Validates - "MAP" Exit - PA	MAP DELET Legend goes out			
						25 MILE	12	Change format to 25 mile scale. Only valid if 50, 100, or 200 mile scale currently selected Exit - PA	25 MILE Legend goes out			
						50 MILE	13	Change format to 50 mile scale. Only valid if 25,100, or 200 mile scale currently selected. Exit - PA	50 MILE Legend goes out			
						100 MILE	14	Change format to 100 mile scale. Only valid if 25, 50 or 200 mile scale currently selected. Exit - PA	100 MILE Legend goes out			
						200 MILE	15	Change format to 200 mile scale. Only valid if 25, 50 or 100 mile scale currently selected. Exit - PA	200 MILE Legend goes out			
						A/C CENTR	16	Change format to A/C centered Validates - "A/C DEPRS" Exit - PA	A/C CENTR Legend goes out			
						A/C DEPRS		Change format to A/C depressed Validates - "A/C CENTR" Exit - PA	A/C DEPRS Legend goes out			

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEVEL: NAV (ICP PANEL)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: HSI format, is displayed on UHFD.
All other displays will remain as they were.

FUNC.LBL. RESP/STIM (2ND LEVEL CONTROL)	AC	SYSTEM RESPONSE	FUNC. LBL. RESP/STIM (3RD LEVEL CONTROL)	AC	SYSTEM RESPONSE	FUNC.LBL. RESP/STIM (4TH LEVEL CONTROL)	AC	SYSTEM RESPONSE	FUNC. LBL. RESP/STIM (5TH LEVEL CONTROL)	AC	SYSTEM RESPONSE	FUNC.LBL. RESP/STIM
POINT SELCT (cont'd)			CMPAS (cont'd)			FLTPL	26	Add flight plan to compass format. VALIDATES - "FLTPL DELET" Exit - PA	FLTPL Legend goes out			
						* FLTPL DELET		Deletes flight plan from compass format. Validates - "FLTPL" Exit - PA	FLTPL DELET Legend goes out			
						ALTER FLTPL	27	Add alternate flight plan to compass format. Validates - "ALTPL DELET" Exit - PA	ALTER FLTPL Legend goes out			
						* ALTPL DELET		Deletes alternate flight plan from compass format. Validates - "ALTER FLTPL" Exit - PA	ALTPL DELET Legend goes out			
			MAP	18	Map format, Track up, A/G centered, 10 mile scale displayed on currently selected MAV display. "MAP" to HUD Area 2	TRACK UP	1	Change format to Track UP. Validates - "NORTH UP" Exit - PA	TRACK UP Legend goes out			
						NORTH UP		Change format to North Up Validates - "Track UP" Exit - PA	NORTH UP Legend goes out			
						CMPAS	6	Add Compass to Map format. Validates - "CMPAS DELET" Exit - PA	CMPAS Legend goes out			
						* CMPAS DELET		Deletes compass from Map format. Validates - "CMPAS" Exit - PA	CMPAS DELET Legend goes out			
						25 MILE	12	Change format to 25 mile scale. Only valid if 50, 100, or 200 mile scale currently selected Exit - PA	25 MILE Legend goes out			
						* 50 MILE	13	Change format to 50 mile scale. Only valid if 25, 100, or 200 mile scale currently selected. Exit - PA	50 MILE LEGEND goes out			
						100 MILE	14	Change format to 100 mile scale. Only valid if 25, 50 or 200 mile scale currently selected Exit - PA	100 MILE Legend goes out			

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: NAV (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NAV format. is displayed on LMFD.
All other displays will remain as they were.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
POINT SELCT (cont'd)			MAP (cont'd)			200 MILE	15.	Change format to 200 mile scale. Only valid if 25, 50, or 100 mile scale currently selected. Exit - PA	200 MILE Legend goes out			
						* A/C CENTR	16	Change format to A/C centered. Validates - "A/C DEPRS" Exit - PA	A/C CENTR Legend goes out			
						A/C DEPRS		Change format to A/C depressed. Validates - "A/C CENTR" Exit - PA	A/C DEPRS Legend goes out			
						FLTPL	26	Add flight plan to map format Validates - "FLTPL DELET" Exit - PA	FLTPL Legend goes out			
						* FLTPL DELET		Deletes flight plan from map format. Validates - "FLTPL" Exit - PA	FLTPL DELET Legend goes out			
						ALTER FLTPL	27	Add alternate flight plan to map format Validates - "ALTPL DELET" Exit - PA	ALTER FLTPL Legend goes out			
						* ALTPL DELET		Deletes alternate flight plan from map format. Validates - "ALTER FLTPL" Exit - PA	ALTPL DELET Legend goes out			
			WAYPT DESTN	13	Flight plan format is displayed on current NAV display. Waypoint I.D. numbers are shown. "WAYPT DESTN" to SFD Area 2	INTEGER KEYSET ENABLED		Cueing message "WAYPT" appears on upper line of SFD data area. System checks validity and accepts Waypoint. System sends acknowledge message (reverse polarity) that action is complete. Distance to entered Waypoint is calculated and displayed on Flight Plan format for 1 minute.	Return to 2nd level Control			

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: NAV (SCP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: [illegible] format, is displayed on LMFD.
All other displays will remain as they were.

— — (2ND LEVEL CONTROL) — — (3RD LEVEL CONTROL) — — (4TH LEVEL CONTROL) — — (5TH LEVEL CONTROL) — —

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
POINT SELCT (cont'd)			WAYPT TIME	14	Flight plan format is displayed, on current NAV display. Waypoint I. D. numbers are shown. "WAYPT TIME" to SFD Area 2	INTEGER RESET ENABLED		Ongoing message "WAYPT" appears on upper line of SFD data area. System checks validity and accepts Waypoint. System sends acknowledge message (reverse polarity) that action is complete. Time to entered waypoint is calculated and displayed on the Flight Plan format for 1 minute.	Return to 2nd level Control			
			LAND 1	16	Display Land 1 format, Fig. TBD, on current NAV display. "LAND 1" to SFD Area 2	Return to 2nd level Control						
			LAND 2	17	Display LAND 2 format, Fig. TBD, on current NAV Display. "LAND 2" to SFD Area 2	Return to 2nd level Control						
			SENSR	31	Video Recorder to Current NAV Display. "SENSR" to SFD Area 2	Return to 2nd level Control						
			SENSR MIX	32	Display video recorder mixed with current symbology on current NAV display. "SENSR MIX" to SFD Area 2	Return to 2nd Level Control						
			DCLUT 1	34	Remove following from NAV display: TBD Validates - "DCL 1 DELET" Exit - PA	DCLUT 1 Legend goes out						
			* DCL 1 DELET		Removes format from DCLUT 1 mode. Validates - "DCLUT 1" Exit - PA	DCL 1 DELET Legend goes out						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: NAV (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: [illegible] format, is displayed on [illegible].
All other displays will remain as they were.

---(2ND LEVEL CONTROL)---
---(3RD LEVEL CONTROL)---
---(4TH LEVEL CONTROL)---
---(5TH LEVEL CONTROL)---

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
POINT DSLCT (cont'd)			BCLNT 2	25	Remove following from NAV display: TBD Validates - "BCL 2 DSLCT" Exit - PA	BCLNT 2 Legend goes out						
			* BCL 2 DSLCT		Removes format from BCLNT 2 mode. Validates - "BCLNT 2" Exit - PA	BCL 2 DSLCT Legend goes out						
			FLTPL	26	Flight plan format, Track up, A/C centered, 30 mile scale displayed on currently selected NAV display. "FLTPL" to SPD Area 3	TRACK UP	1	Change format to Track Up. Validates - "NORTH UP" Exit - PA	TRACK UP Legend goes out			
						NORTH UP		Change format to North Up. Validates - "TRACK UP" Exit - PA	NORTH UP Legend goes out			
						CMPAS	6	Add compass to flight plan format. Validates - "CMPAS DSLCT" Exit - PA	CMPAS Legend goes out			
						* CMPAS DSLCT		Deletes compass from flight plan format. Validates - "CMPAS" Exit - PA	CMPAS DSLCT Legend goes out			
						MAP	11	Add map to flight plan format Validates - "MAP DSLCT" Exit - PA	MAP Legend goes out			
						* MAP DSLCT		Deletes map from flight plan format. Validates - "MAP" Exit - PA	MAP DSLCT Legend goes out			
						25 MILE	12	Change format to 25 mile scale. Only valid if 30, 100 or 200 mile scale currently selected. Exit - PA	25 MILE Legend goes out			
						* 30 MILE	13	Change format to 30 mile scale. Only valid if 25, 100 or 200 mile scale currently selected. Exit - PA	30 MILE Legend goes out			

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: NAV (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NAV1 format, is displayed on LMFD.
All other displays will remain as they were.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

FUNC.LEG. RESP/STIM	AC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	FUNC.LEG. RESP/STIM	AC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	FUNC.LEG. RESP/STIM
POINT SELCT (cont'd)			FLTPL (cont'd)									
						100 MILE	14	Change format to 100 mile scale. Only valid if 25, 50 or 200 mile scale currently selected. Exit - PA	100 MILE Legend goes out			
						200 MILE	13	Change format to 200 mile scale. Only valid if 25, 50 or 100 mile scale currently selected. Exit - PA	200 MILE Legend goes out			
						* A/C CENTR	16	Change format to A/C centered. Validates - "A/C DEPRS" Exit - PA	A/C CENTR Legend goes out			
						A/C DEPRS		Change format to A/C depressed. Validates - "A/C CENTR" Exit - PA	A/C DEPRS Legend Goes out			
						ALTER FLTPL	27	Add alternate flight plan to flight plan format. Validates - "ALTPL DELET" Exit - PA	ALTER FLTPL Legend goes out			
						* ALTPL DELET		Delete alternate flight plan from flight plan format. Validates - "ALTER FLTPL" Exit - PA	ALTPL DELET Legend goes out			
			ALTER FLTPL	27	Alternate flight plan format, Track up, A/C centered, 50 mile scale - displayed on currently selected NAV display. "ALTER FLTPL" to SPD Area 2	TRACK * UP	4	Change format to Track UP. Validates - "NORTH UP" Exit - PA	TRACK UP Legend goes out			
						NORTH UP		Change format to North Up. Validates - "TRACK UP." Exit - PA	NORTH UP Legend goes out			
						CMPAS	6	Adds compass to alternate flight plan format. Validates - "CMPAS DELET" Exit - PA	CMPAS Legend goes out			
						* CMPAS DELET		Deletes compass from alternate flight plan format. Validates - "CMPAS" Exit - PA	CMPAS DELET Legend goes out			

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: NAV (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: ANSI format, . is displayed on UFD.
All other displays will remain as they were.

(2ND LEVEL CONTROL)

(3RD LEVEL CONTROL)

(4TH LEVEL CONTROL)

(5TH LEVEL CONTROL)

PRNG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PRNG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PRNG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PRNG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PRNG.LEG. RESP/STIM
FUNCT SELCT (cont'd)			ALTER FLTPL (cont'd)									
						MAP	31	Adds map to alternate flight plan format Validates - "MAP DELET" Exit - PA	MAP Legend goes out			
						• MAP DELET		Deletes map from alternate flight plan format. Validates - "MAP" Exit - PA	MAP DELET Legend goes out			
						25 MILE	32	Change format to 25 mile scale. Only valid if 50, 100 or 200 mile scale currently selected. Exit - PA	25 MILE Legend goes out			
						• 50 MILE	33	Change format to 50 mile scale Only valid if 25, 100, or 200 mile scale currently selected. Exit - PA	50 MILE Legend goes out			
						100 MILE	34	Change format to 100 mile scale. Only valid if 25, 50, or 200 mile scale currently selected. Exit - PA	100 MILE Legend goes out			
						200 MILE	35	Change format to 200 mile scale Only valid if 25, 50 or 100 mile scale currently selected Exit - PA	200 MILE Legend Goes out			
						• A/C CENTR	36	Change format to A/C centered Validates - "A/C DEPRS" Exit - PA	A/C CENTR Legend goes out			
						A/C DEPRS		Change format to A/C depressed Validates - "A/C CENTR" Exit - PA	A/C DEPRS Legend goes out			

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: NAV (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: EHSI format, is displayed on LMFD.
All other displays will remain as they were.

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(2ND LEVEL CONTROL) PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	(3RD LEVEL CONTROL) PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	(4TH LEVEL CONTROL) PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	(5TH LEVEL CONTROL) PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
FORMT SELCT (cont'd)			ALTER FLTPL (cont'd)									
						FLTPL	26	Add flight plan to alternate flight plan format. Validates - "FLTPL DELET" Exit - PA	FLTPL Legend goes out			
						9 FLTPL DELET		Deletes flight plan from alternate flight plan format Validates - "FLTPL" Exit - PA	FLTPL DELET Legend goes out			
			INFO AMPLF	30	Enable Cursor on NAV display "INFO AMPLF" to SFD Area 2	Force-stick Enabled		Position cursor on display based on force stick inputs	NONE			
						DESIG	16	Provide amplifying information for hooked symbol when "DESIG" is selected. Exit - PA	NONE			
			UMFD	4	FORMT SELCT formats displayed on UMFD LMFD - DV Exit - PA	UMFD Legend goes out						
			• LMFD	9	FORMT SELCT formats displayed on LMFD UMFD - DV Exit - PA	LMFD Legend goes out						
UMFD	4	NAV formats displayed on UMFD LMFD - DV Exit - PA	UMFD Legend goes out									
• LMFD	9	NAV formats displayed on LMFD UMFD - DV Exit - PA	LMFD Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: IFF (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
MASTR MODE	1	CDNU Status format displayed on current IFF display location. "MASTR MODE" to SPD Area 1	STBY *	1	Apply power to IFF Validates - "All other functions" Exit - FA	STBY Legend goes out						
			OFF		Remove power from IFF Validates - "STBY"	Return to 2nd level Control						
			NORM *	6	Normal level sensitivity to IFF Validates - "LOW"	Return to 2nd level Control						
			LOW		Low level sensitivity to IFF Validates - "NORM"	Return to 2nd level return						
			EMERG	16	Generate mode 1,2,3A, and C replies to IFF	Return to 2nd Level Control						
MODE 1	6	CDNU Status format displayed on current IFF display location. "MODE 1" to SPD Area 1	* ON	1	Enable MODE 1 Validates - "OFF" Exit - FA	ON Legend goes out						
			OFF		Disable MODE 1 Validates - "ON"	Return to 2nd level Control						
			CODE FIG 1028		"CODE" TO SPD Area 2	LATCHED KEYSET ENABLED		Coding message "CODE" appears on upper line of SPD data area. System checks validity, accepts and send MODE 1 Code to IFF. System sends acknowledge message (reverse polarity) that action is complete.	Return to 2nd level Control			
MODE 2	11	CDNU Status format displayed on current IFF display location. "MODE 2" to SPD Area 1	* ON	1	Enable MODE 2 Validates - "OFF" Exit - FA	ON Legend goes out IFF KEYSET Enabled						
			OFF		Disable MODE 2 Validates - "ON"	Return to 2nd level Control						

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: IFF (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
			CODE		"CODE" to SFD Area 2	INTEGER KEYSET ENABLED		Cueing message "CODE" appears on upper line of SFD data area. System checks validity, accepts and sends MODE 2 Code to IFF. System sends acknowledge message (reverse polarity) that action is complete.	Return to 2nd level Control			
MODE 3A	6	CDNU Status format displayed on current IFF display location. "MODE 3A" to SFD Area 1	* ON	1	Enable MODE 3A Validates - "OFF" Exit - PA	ON Legend goes out IFF KEYSET ENABLED						
			OFF		Disable MODE 3A Validates - "ON"	Return to 2nd level Control						
			CODE		"CODE" to SFD Area 3	INTEGER KEYSET ENABLED		Cueing message "CODE" appears on upper line of SFD data area. System checks validity, accepts and sends MODE 3A CODE to IFF. System sends acknowledge message (reverse polarity) that action is complete.	Return to 2nd level Control			
MODE 3C	11	CDNU Status format displayed on current IFF display location. "MODE 3C" to SFD Area 1	* ON	1	Enable MODE 3C Validates - "OFF" Exit - PA	ON Legend goes out IFF KEYSET Enabled						
			OFF		Disable MODE 3C Validates - "ON"	Return to 2nd level Control						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: IFF (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PBNG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PBNG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PBNG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PBNG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PBNG.LEG. RESP/STIM
			CODE		"CODE to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "CODE" appears on upper line of SPD data area. System checks validity, accepts and sends MODE 3C Code to IFF. System sends acknowledge message (reverse polarity) that action is complete.	Return to 2nd level Control			
MODE 4	11	CODE Status format displayed on current IFF display location "MODE 4" to SPD Area 1	• ON	1	Enable MODE 4 Validate - "OFF" Exit - PA	ON Legend goes out IFF KEYSET Enabled						
			OFF		Disable MODE 4 Validate - "ON"	Return to 2nd Level Control						
			CODE		"CODE" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "CODE" appears on upper line of SPD data area. System checks validity, accepts and sends MODE 4 code to IFF. System sends acknowledge message (reverse polarity) that action is complete	Return to 2nd level Control			
UMFD	4	IFF formats displayed on UMFD RSAD - BV LSAD - V LMFD - V Exit - PA	UMFD Legend goes out									
LMFD	9	IFF formats displayed on LMFD RSAD - BV UMFD - V LSAD - V Exit - PA	LMFD Legend goes out									
LSAD	8	IFF formats displayed on LSAD RSAD - BV UMFD - V LMFD - V Exit - PA	LSAD Legend goes out									
* RSAD	10	IFF formats displayed on RSAD UMFD - V LMFD - V LSAD - V Exit - PA	RSAD Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: SENSOR (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
RADAR	5	"RADAR" to SPD Area 1 Exit - PA	* ON	1	Selects Radar for display and ICP control. Validates - All other functions Exit - PA	ON Legend goes out						
			OFF		Deselects Radar. Validates - ON All other functions - 1	Return to 2nd level Control						
			GAIN	2	"GAIN" to SPD Area 2	Return to 2nd level Control		These functions are not implemented in the AIM System				
			RANGE	6	"RANGE" to SPD Area 2	Return to 2nd level Control						
			MODE SELCT	11	"MODE SELCT" to SPD Area 2	Return to 2nd level Control						
			SCAN SELCT	21	"SCAN SELCT" to SPD Area 2	Return to 2nd level Control						
			SYMBL ADD	20	Add symbology (TDD) to Radar format Validates - "SYMBL DELET" Exit - PA	SYMBL ADD Legend goes out						
			* SYMBL DELET		Delete symbology (TDD) from Radar format Validates - "SYMBL ADD" Exit - PA	SYMBL DELET Legend goes out						
			HUD	3	Radar format (Video Recorder) displayed on HUD. MFPD - PV HHD - V LMFD - V Exit - PA	HUD Legend goes out						
			* MFPD	5	Radar format (Video Recorder) displayed on MFPD. HUD - V HHD - V LMFD - V Exit - PA	MFPD Legend goes out						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: SENSOR (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM
RADAR (cont'd)			HMD	5	Radar format (Video Recorder) displayed on HMD HMFD - BV HMD - V LMFD - V Exit - FA	HMD Legend goes out						
			LMFD	9	Radar format (video recorder) displayed on LMFD HMFD - BV HMD - V HMD - V Exit - FA	LMFD Legend goes out						
FLIR	11	"FLIR" to SPD Area 1 Exit - FA	ON	1	Selects FLIR for display and ICP control. Validates - All other functions Exit - FA	ON Legends goes out						
			OFF		Deselects FLIR Validates - ON All other functions - I	Return to 2nd level Control						
			GAIN	3	"GAIN" to SPD Area 2	Return to 2nd level Control		These functions are not implemented in the ARI System.				
			MODE SELCT	11	"MODE SELCT" to SPD Area 2	Return to 2nd level Control						
			SYMBL ADD	20	Add symbology (TBD) to FLIR format Validates - "SYMBL DELET" Exit - FA	SYMBL ADD Legend goes out						
			SYMBL DELET		Delete symbology (TBD) from FLIR format Validates - "SYMBL ADD" Exit - FA	SYMBL DELET Legend goes out						

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: SENSOR (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

— — — (2ND LEVEL CONTROL) — — —

— — — (3RD LEVEL CONTROL) — — —

— — — (4TH LEVEL CONTROL) — — —

— — — (5TH LEVEL CONTROL) — — —

PUSH.LEG. RESP/STIM	LAC	SYSTEM RESPONSE	PUSH. LEG. RESP/STIM	LAC	SYSTEM RESPONSE	PUSH.LEG. RESP/STIM	LAC	SYSTEM RESPONSE	PUSH. LEG. RESP/STIM	LAC	SYSTEM RESPONSE	PUSH.LEG. RESP/STIM
FLIR (cont'd)												
			HUD	3	FLIR format (Video Recorder) displayed on HUD RMFD - BV HMD - V LMFD - V Exit - PA	HUD Legend goes out						
			* RMFD	4	FLIR format (Video Recorder) displayed on RMFD HUD - V HMD - V LMFD - V Exit - PA	RMFD Legend goes out						
			HMD	5	FLIR format (Video Recorder) displayed on HMD RMFD - BV HUD - V LMFD - V Exit - PA	HMD Legend goes out						
			LMFD	9	FLIR format (Video Recorder) displayed on LMFD RMFD - BV HUD - V HMD - V Exit - PA	LMFD Legend goes out						
LLLTV	21	"LLLTV" to SFD Area 1 Exit - PA	* ON	1	Selects LLLTV for display and ICP control. Validates - All other functions Exit - PA	ON Legend goes out						
			OFF		Deselects LLLTV Validates - ON All other functions - I	Return to 2nd level Control						
			GAIN	2	"GAIN" to SFD Area 2	Return to 2nd level Control		These functions are not implemented in the AAH System				
			MODE SELCT	11	"MODE SELCT" to SFD Area 2	Return to 2nd level Control						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: SENSOR (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

PUSH. LOC. RESP/STIM (2ND LEVEL CONTROL)	LOC	SYSTEM RESPONSE	PUSH. LOC. RESP/STIM (3RD LEVEL CONTROL)	LOC	SYSTEM RESPONSE	PUSH. LOC. RESP/STIM (4TH LEVEL CONTROL)	LOC	SYSTEM RESPONSE	PUSH. LOC. RESP/STIM (5TH LEVEL CONTROL)	LOC	SYSTEM RESPONSE	PUSH. LOC. RESP/STIM
LLLTV (cont'd)												
			SYMBOL ADD	20	Add Symbology (TBD) to LLLTV format Validates "SYMBOL DELET" Exit - PA	SYMBOL ADD Legend goes out						
			SYMBOL DELET		Delete symbology (TBD) from LLLTV format Validates "SYMBOL ADD" Exit - PA	SYMBOL DELET Legend goes out						
			HMD	3	LLLTV format (Video Recorder) displayed on HMD. RMFD - PV HUD - V LMFD - V Exit - PA	HMD Legend goes out						
			RMFD	4	LLLTV format (Video Recorder) displayed on RMFD HUD - V HMD - V LMFD - V Exit - PA	RMFD Legend goes out						
			HUD	5	LLLTV format (Video Recorder) displayed on HUD RMFD - PV HMD - V LMFD - V Exit - PA	HUD Legend goes out						
			LMFD	9	LLLTV format (Video Recorder) displayed on LMFD RMFD - PV HUD - V HMD - V Exit - PA	LMFD Legend goes out						

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: STEER (SCP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: Steering format, Displayed on LWD

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
COMND ALT	[illegible]	"COMND ALT" to SPD Area 1 Exit - PA	INTEGER KEYSET ENABLED		Cueing message "ALT" appears on upper line of SPD data area. System checks validity and accepts command altitude. System sends acknowledge message (reverse polarity) that action is complete. COMND ALT is displayed on steering format, Fig.	Return to 2nd Level Control						
COMND A/S	5	"COMND A/S" to SPD Area 1 Exit - PA	DECIMAL KEYSET Enabled		Cueing Message "A/S" appears on upper line of SPD data area. System checks validity and accepts command airspeed. System sends acknowledge message (reverse polarity) that action is complete. COMND A/S is displayed on Steering format, Fig.	Return to 2nd Level Control						
COMND HEADG	11	"COMND HEADG" to SPD Area 1 Exit - PA	HEADING KEYSET ENABLED		Cueing message "HEADG" appears on upper line of SPD data area. System checks validity and accepts command heading. System sends acknowledge message (reverse polarity) that action is complete. COMND HEADG is displayed on steering format, Fig.	Return to 2nd Level Control						
COMND CORSE	16	"COMND CORSE" to SPD Area 1 Exit - PA	HEADING KEYSET ENABLED		Cueing Message "CORSE" appears on upper line of SPD data area. System checks validity and accepts command course. System sends acknowledge message (reverse polarity) that action is complete. COMND CORSE is displayed on steering format, Fig.	Return to 2nd Level Control						
NAV	21	"NAV" to SPD Area 1 Exit - PA (NOT IMPLEMENTED IN AUM SYSTEM)	Return to 2nd Level Control									
ACLS	22	"ACLS" to SPD Area 1-Enable ACLS Exit - PA	Return to 2nd Level Control									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: STEER (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: Steering format, Fig. , displayed on LMFD

(2ND LEVEL CONTROL)

(3RD LEVEL CONTROL)

(4TH LEVEL CONTROL)

(5TH LEVEL CONTROL)

FUNC. LOC. DISP/STEM	LOC	SYSTEM RESPONSE	FUNC. LOC. DISP/STEM	LOC	SYSTEM RESPONSE	FUNC. LOC. DISP/STEM	LOC	SYSTEM RESPONSE	FUNC. LOC. DISP/STEM	LOC	SYSTEM RESPONSE	FUNC. LOC. DISP/STEM
DATA LINK	26	Prepare system to receive steering data via Data Link. Received data displayed on steering format. "DATA LINK" to ATD Arcg) Exit - PA	Return to 2nd level Control									
HUD	3	STEER formats displayed on HUD LMFD - BV HMFD - V HHD - V Exit - PA	HUD Legend goes out									
HMFD	4	STEER formats displayed on HMFD LMFD - BV HUD - V HHD - V Exit - PA	HMFD Legend goes out									
HHD	3	STEER formats displayed on HHD LMFD - BV HUD - V HMFD - V Exit - PA	HHD Legend goes out									
• LMFD	9	STEER formats displayed on LMFD HMFD - V HUD - V HHD - V Exit - PA	LMFD Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: VERT INFO (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
C/A FORMT	1	Display Contact Analog format on current vertical situation display location "C/A FORMT" to SPD Area 1 Exit - PA	C/A FORMT Legend Goes out									
PREDC FORMT	6	Display Predictor format on current vertical situation display location "PREDC FORMT" to SPD Area 1 Exit - PA	PREDC FORMT Legend goes out									
CONVN FORMT	11	Display conventional format on current vertical situation display location. "CONVN FORMT" to SPD Area 1 Exit - PA	CONVN FORMT Legend goes out									
SENSR	23	Display Video Recorder output on current vertical situation display location "SENSR" to SPD Area 1	Return to 2nd level Control									
SENSR MIX	22	Display Video Recorder output mixed with current format on current VSD location. "SENSR MIX" to SPD Area 1	Return to 2nd level Control									
BCLUT 1	24	Remove following from VERT INFO format: TBD Validates - "BCL 1 DELET" Exit - PA	BCLUT 1 Legend goes out									
* BCL 1 DELET		Removes format from BCLUT 1 Mode. Validates - "BCLUT 1" Exit - PA	BCL 1 DELET Legend goes out									
BCLUT 2	25	Remove following from VERT INFO format: TBD Validates - "BCL 2 DELET" Exit - PA	BCLUT 2 Legend goes out									
* BCL 2 DELET		Removes format from BCLUT 2 Mode. Validates - "BCLUT 2" Exit - PA	BCL 2 DELET Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: VERT INFO (ICP FIELD) (1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL)

(3RD LEVEL CONTROL)

(4TH LEVEL CONTROL)

(5TH LEVEL CONTROL)

PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM
[illegible]	[illegible]	VERT INFO displayed on [illegible] [illegible] - V [illegible] - FA	[illegible] Legend goes out									
[illegible]	[illegible]	VERT INFO displayed on [illegible] [illegible] - [illegible] [illegible] - FA	[illegible] Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: HUD INFO (UCP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
STAND FORMT	1	Display standard HUD format, on current HUD display location "STAND FORMT" to MFD Area 1 Exit - PA	STAND FORMT Legend goes out									
STDBY RETCL	2	Enabled HUD standby reticle "STDBY RETCL" to MFD Area 1 Validates - "RETCL OFF" Exit - PA	STDBY RETCL Legend goes out									
RETCL OFF		Turns off HUD standby reticle Validates - "STDBY RETCL" Exit - PA	RETCL OFF Legend goes out									
HEADG FORMT	6	Display Heading format, on current HUD display location. "HEADG FORMT" to MFD Area 1 Exit - PA	HEADG FORMT Legend goes out									
CRUSE	7	Display Cruise format, on current HUD display location. "CRUSE" to MFD Area 1 Exit - PA	CRUSE Legend goes out									
VSTOL FORMT	11	Display VSTOL format, on current HUD display location. "VSTOL FORMT" to MFD Area 1 Exit - PA	VSTOL FORMT Legend goes out									
TRNSN T/O	13	Display TRANSITION T/O format on current HUD display location. "TRNSN T/O" to MFD Area 1 Exit - PA	TRNSN T/O Legend goes out									
LAND 1	14	Display LAND 1 format, on current HUD display location. "LAND 1" to MFD Area 1 Exit - PA	LAND 1 Legend goes out									

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: HUD INFO (TCP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
LAND 2	27	Display LAND 2 format, on current HUD display location. "LAND 2" to SPD Area 1 Exit - FA	LAND 2 Legend goes out									
THRSH LAND	16	Display THRSH LAND format, on current HUD display location "THRSH LAND" to SPD Area 1 Exit - FA	THRSH LAND Legend goes out									
SENSR	21	Display Video Recorder output on current HUD location "SENSR" to SPD Area 1	Return to 2nd level control									
SENSR MIX	22	Display Video Recorder output mixed with current format on current HUD location "SENSR MIX" to SPD Area 1	Return to 2nd level Control									
DCLUT 1	24	Remove following from HUD format: TBD Validates - "DCL 1 DELET" Exit - FA	DCLUT 1 Legend goes out									
* DCL 1 DELET		Removes format from DCLUT 1 Mode. Validates - "DECLUT 1" Exit - FA	DCL 1 DELET Legend goes out									
DCLUT 2	25	Remove following from HUD format: TBD Validates - "DCL 2 DELET" Exit - FA	DCLUT 2 Legend goes out									
* DCL 2 DELET		Removes format from DCLUT 2 Mode Validates - "DCLUT 2" Exit - FA	DCL 2 DELET Legend Goes out									
* HUD	3	Display HUD info on HUD HDFD - V HUD - V Exit - FA	HUD Legend goes out									
HDFD	4	Display HUD info on HDFD HUD - BV HUD - V Exit - FA	HDFD Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: [illegible] INFO (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

- - - - (2ND LEVEL CONTROL) - - - -
- - - - (3RD LEVEL CONTROL) - - - -
- - - - (4TH LEVEL CONTROL) - - - -
- - - - (5TH LEVEL CONTROL) - - - -

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
[illegible]	5	Display [illegible] Info on [illegible] [illegible] - [illegible] [illegible] - [illegible] [illegible] - [illegible]	[illegible] Legend goes out									

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TABLE B-1. PILOT CONTROL/[illegible]TION/SYSTEM REFERENCE (Continued)

LEGEND: MHD INFO (ICP FIXED) (1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LBL. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LBL. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LBL. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LBL. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LBL. RESP/STIM
HORIZ LINE	1	Display HORIZ LINE format, on current MHD display location. "HORIZ LINE to SFD Area 1 Exit - FA	HORIZ LINE Legend goes out									
HORIZ RETCL	2	Display HORIZ RETCL format, on current MHD display location. "HORIZ RETCL" to SFD Area 1 Exit - FA	HORIZ RETCL Legend goes out									
WAYPT DESIG	6	Display valid waypoint I.D.'s on READ. Enable HFS. "WAYPT DESIG" to SFD Area 1 When designate signal is received from HFS (TAE switch) display next valid waypoint I.D. & LOS AZ and EL on MHD. When enter signal is received from HFS (TAE switch) store waypoint I.D., surface position and entry time-display on MHD Exit - FA	NONE									
WAYPT VISUL	7	Set up for visual sighting of stored waypoint "WAYPT VISUL" to SFD Area 1	INTEGER KEYSET ENABLED		Cueing message "WAYPT NO." displayed on upper line of SFD data area. After receipt of entered Waypoint I.D. display cue arrow onMHD to position LOS for visual sighting of Waypoint. Exit - FA	NONE						
WAYPT ADD	12	WAYPT TABULATION format, Displayed on READ "WAYPT ADD" to SFD Area 1	(1) LAT KEYSET ENABLED (2) LONG KEYSET ENABLED		Cueing message appears on upper line of SFD data area. System validates, accepts, and assigns next valid Waypoint ID to entered data. Order of entry is: (1) "LAT" (2) "LONG" Entered Waypoint is displayed on WAYPT TABULATION format, on Flight Plan format; and on MHD.	Return to 2nd level control						

TABLE B-1, PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: HMD INFO (ICO FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
WAYPT DELET	12	WAYPT TABULATION format, displayed on HSAD. "WAYPT DELET" to SPD Area 1	INTEGRA KEYSET ENABLED		Cueing message "WAYPT NO.?" displayed on upper line of SPD data grop. System validates, accepts and deletes from memory entered Waypoint. Waypoint is deleted from WAYPT TABULATION format Flight Plan format, and HMD Exit - PA	NONE						
PITCH LADER	16	Display PITCH LADER format, on current HMD display location. "PITCH LADER" to SPD Area 1 Exit - PA	PITCH LADER Legend goes out									
SENSR	21	Display Video Recorder output on current HMD display location "SENSR" to SPD Area 1	Return to 2nd level Control									
SENSR MIX	22	Display Video Recorder mixed with current symbology on current HMD display. "SENSR MIX" to SPD Area 1.	Return to 2nd level Control									
HMD	3	Display HMD info on HMD HMD - DV Exit - PA	HMD Legend goes out									
* HMD	5	Display HMD info on HMD HMD - V Exit - PA	HMD Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: HORIZ INFO (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
HSI	1	HSI format, displayed on current HORIZ INFO display. "HSI" to BPD Area 1 Exit - PA	HSI Legend goes out									
CMPAS	6	Compass rose format, Track up A/C centered, 50 mi. scale-displayed on currently selected HORIZ INFO display. "CMPAS" to BPD Area 1	* TRACK UP	1	Change format to Track up. Validation - "NORTH UP" Exit - PA	TRACK UP Legend goes out						
			NORTH UP *		Change format to North Up. Validation - "TRACK UP" Exit - PA	NORTH UP Legend goes out						
			MAP	11	Adds map to compass format. Validation - "MAP DELET" Exit - PA	MAP Legend goes out						
			* MAP DELET		Deletes map from compass format Validation - "MAP" Exit - PA	MAP DELET Legend goes out						
			25 MILE	12	Change format to 25 mile scale. Only valid if 50,100, or 200 mile scale currently selected. Exit - PA	25 MILE Legend goes out						
			* 50 MILE	13	Change format to 50 mile scale. Only valid if 25, 100, or 200 mile scale currently selected. Exit - PA	50 MILE Legend goes out						
			100 MILE	14	Change format to 100 mile scale. Only valid if 25, 50 or 200 mile scale currently selected. Exit - PA	100 MILE Legend						
			200 MILE	15	Change format to 200 mile scale. Only valid if 25, 50 or 100 mile scale currently selected. Exit - PA	200 MILE Legend goes out						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: HORIZ INFO (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PNHG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PNHG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PNHG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PNHG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PNHG. LEG. RESP/STIM
CMPAS (cont'd)			* A/C CENTR	16	Change format to A/C centered. Validates - "A/C DEPRS" Exit - PA	A/C CENTR Legend goes out						
			A/C DEPRS		Change format to A/C depressed. Validates - "A/C CENTR" Exit - PA	A/C DEPRS Legend goes out						
			FLTPL	26	Add flight plan to compass format. Validates - "FLTPL DELET" Exit - PA	FLTPL Legend goes out						
			* FLTPL DELET		Deletes flight plan from compass format. Validates - "FLTPL" Exit - PA	FLTPL DELET Legend goes out						
			ALTER FLTPL	27	Add alternate flight plan to compass format. Validates - "ALTPL DELET" Exit - PA	ALTER FLTPL Legend goes out						
			* ALTPL DELET		Deletes alternate flight plan from compass format. Validates - "ALTER FLTPL" Exit - PA	ALTPL DELET Legend goes out						
MAP	11	Map format, Track up, A/C centered, 50 mile scale - displayed on currently selected HORIZ INFO display. "MAP" to BFD Area 1	* TRACK UP	1	Change format to Track Up. Validates - "NORTH UP" Exit - PA	TRACK UP Legend goes out						
			NORTH UP		Change format to North Up. Validates - "TRACK UP" Exit - PA	NORTH UP Legend goes out						
			CMPAS	6	Add compass to Map format. Validates - "CMPAS DELET" Exit - PA	CMPAS Legend goes out						
			* CMPAS DELET		Deletes compass from Map format. Validates - "CMPAS" Exit - PA	CMPAS DELET Legend goes out						
			25 MILE	12	Change format to 25 mile scale. Only valid if 50, 100 or 200 mile scale currently selected. Exit - PA	25 MILE Legend goes out						

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: NOMIS INFO (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

— — — — (2ND LEVEL CONTROL) — — — —
— — — — (3RD LEVEL CONTROL) — — — —
— — — — (4TH LEVEL CONTROL) — — — —
— — — — (5TH LEVEL CONTROL) — — — —

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
MAP (cont'd)												
			• 50 MILE	13	Change format to 50 mile scale. Only valid if 25, 100 or 200 mile scale currently selected. Exit - PA	50 MILE Legend goes out						
			100 MILE	14	Change format to 100 mile scale. Only valid if 25, 50 or 200 mile scale currently selected Exit - PA	100 MILE Legend goes out						
			200 MILE	15	Change format to 200 mile scale. Only valid if 25, 50, or 100 mile scale currently selected. Exit - PA	200 MILE Legend goes out						
			• A/C CENTR / A/C DEPRS	16	Change format to A/C centered Validates - "A/C DEPRS" Exit - PA Change format to A/C depressed Validates - "A/C CENTR" Exit - PA	A/C CENTR Legend goes out A/C DEPRS Legend goes out						
			FLTPL / • FLTPL DELET	26	Add flight plan to map format Validates - "FLTPL DELET" Exit - PA Deletes flight plan from map format Validates - "FLTPL" Exit - PA	FLTPL Legend goes out FLTPL DELET Legend goes out						
			ALTER FLTPL / • ALTPL DELET	27	Add alternate flight plan to map format Validates - "ALTPL DELET" Exit - PA Deletes alternate flight plan from map format Validates - "ALTER FLTPL" Exit - PA	ALTER FLTPL Legend goes out ALTPL DELET Legend goes out						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: HORIZ INFO (ICP FIXED) (1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LBG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LBG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LBG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LBG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LBG. RESP/STIM
WAYPT DISTN	13	Flight plan format is displayed on current HORIZ INFO display. Waypoint I.D. numbers are shown. "WAYPT DISTN" to SPD Area 1	INTEGER KEYSET ENABLED		Cueing message "WAYPT" appears on upper line of SPD data area. System checks validity and accepts Waypoint. System sends acknowledge message (reverse polarity) that action is complete. Distance to entered Waypoint is calculated and displayed on Flight Plan format for 1 minute.	Return to 2nd level Control						
WAYPT TIME	14	Flight plan format is displayed on current HORIZ INFO display. Waypoint I.D. numbers are shown. "WAYPT TIME" to SPD Area 1	INTEGER KEYSET ENABLED		Cueing message "WAYPT" appears on upper line of SPD data area. System checks validity and accepts Waypoint. System sends acknowledge message (reverse polarity) that action is complete. Time to entered Waypoint is calculated and displayed on the Flight Plan format for 1 minute.	Return to 2nd level Control						
LAND 1	16	Display LAND 1 format, on current HORIZ INFO display. "LAND 1" to SPD Area 1	Return to 2nd level Control									
LAND 2	17	Display LAND 2 format, on current HORIZ INFO display. "LAND 2" to SPD Area 1	Return to 2nd level Control									
SENSR	21	Video Recorder to Current HORIZ INFO display. "SENSR" to SPD Area 1	Return to 2nd level Control									
SENSR MIX	22	Display video recorder mixed with current symbology on current HORIZ INFO display. "SENSR MIX" to SPD Area 1	Return to 2nd level Control									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: HORIZ INFO (ICP FIXED) (1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) | (3RD LEVEL CONTROL) | (4TH LEVEL CONTROL) | (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
BCLUT 1	24	Remove following from HORIZ INFO display: TBD Validates - "BCL 1 DELET" Exit - PA	BCLUT 1 Legend goes out									
BCL 1 DELET		Removes format from BCLUT 1 mode. Validates - "BCLUT 1" Exit - PA	BCL 1 DELET Legend goes out									
BCLUT 2	25	Remove following from HORIZ INFO display : TBD Validates - "BCL 2 DELET" Exit - PA	BCLUT 2 Legend goes out									
BCL 2 DELET		Removes format from BCLUT 2 mode Validates - "BCLUT 2" Exit - PA	BCL 2 DELET Legend goes out									
FLTPL	26	Flight plan format, Track up, A/C centered, 50 mile scale - displayed on currently selected HORIZ INFO display. "FLTPL" to SPD Area 1	TRACK UP	1	Change format to Track up. Validates - "NORTH UP" Exit - PA	TRACK UP Legend goes out						
			NORTH UP		Change format to NORTH UP Validates - "TRACK UP" Exit - PA	NORTH UP Legend goes out						
			CMPAS	6	Add compass to flight plan format. Validates - "CMPAS DELET" Exit - PA	CMPAS Legend goes out						
			CMPAS DELET		Deletes compass from flight plan format. Validates - "CMPAS" Exit - PA	CMPAS DELET Legend goes out						
			MAP	11	Add map to flight plan format Validates - "MAP DELET" Exit - PA	MAP Legend goes out						
			MAP DELET		Deletes map from flight plan format Validates - "MAP" Exit - PA	MAP DELET Legend goes out						
			25 MILE	12	Change format to 25 mile scale. Only valid if 50, 100, or 200 mile scale currently selected Exit - PA	25 MILE Legend goes out						

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: HORIZ INFO (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PUSH.LEG. DESP/STUS	LOC	SYSTEM RESPONSE	PUSH. LEG. DESP/STUS	LOC	SYSTEM RESPONSE	PUSH.LEG. DESP/STUS	LOC	SYSTEM RESPONSE	PUSH. LEG. DESP/STUS	LOC	SYSTEM RESPONSE	PUSH.LEG. DESP/STUS
FLTPL (cont'd)			• 50 MILE	13	Change format to 50 mile scale. Only valid if 25, 100 or 200 mile scale currently selected. Exit - PA	50 MILE Legend goes out						
			100 MILE	14	Change format to 100 mile scale. Only valid if 25, 50 or 200 mile scale currently selected. Exit - PA	100 MILE Legend goes out						
			200 MILE	15	Change format to 200 mile scale. Only valid if 25, 50 or 100 mile scale currently selected. Exit - PA	200 MILE Legend goes out						
			• A/C CENTR	16	Change format to A/C centered. Validates - "A/C DEPRS" Exit - PA	A/C CENTR Legend goes out						
			A/C DEPRS		Change format to A/C depressed. Validates - "A/C CENTR" Exit - PA	A/C DEPRS Legend goes out						
			ALTER FLTPL	27	Add alternate flight plan to flight plan format. Validates - "ALTPL DELET" Exit - PA	ALTER FLTPL Legend goes out						
			• ALTPL DELET		Delete alternate flight plan from flight plan format. Validates - "ALTER FLTPL" Exit - PA	ALTPL DELET Legend goes out						
ALTER FLTPL	27	Alternate flight plan format, Track up, A/C centered, 50 mile scale - displayed on currently selected HORIZ INFO display. "ALTER FLTPL" to SFD Area 1	TRACK • UP	1	Change format to Track Up. Validates - "NORTH UP" Exit - PA	TRACK UP Legend goes out						
			NORTH UP		Change format to North Up. Validates - "TRACK UP" Exit - PA	NORTH UP Legend goes out						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: [illegible] (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

– – – – – (2ND LEVEL CONTROL) – – – – –
– – – – – (3RD LEVEL CONTROL) – – – – –
– – – – – (4TH LEVEL CONTROL) – – – – –
– – – – – (5TH LEVEL CONTROL) – – – – –

FUNC. LEG. DESP/STIM	AC	SYSTEM RESPONSE	FUNC. LEG. DESP/STIM	AC	SYSTEM RESPONSE	FUNC. LEG. DESP/STIM	AC	SYSTEM RESPONSE	FUNC. LEG. DESP/STIM	AC	SYSTEM RESPONSE	FUNC. LEG. DESP/STIM
ALTER FLTPL (cont'd)			CMPAS	[illegible]	Adds compass to alternate flight plan format. Validates - "CMPAS DELET" Exit - PA	CMPAS Legend goes out						
			CMPAS DELET		Deletes compass from alternate flight plan format. Validates - "CMPAS" Exit - PA	CMPAS DELET LEGEND goes out						
			MAP	11	Adds map to alternate flight plan format Validates - "MAP DELET" Exit - PA	MAP Legend goes out						
			MAP DELET		Deletes map from alternate flight plan format Validates - "MAP" Exit - PA	MAP DELET Legend goes out						
			25 MILE	12	Change format to 25 mile scale. Only valid if 50, 100 or 200 mile scale currently selected. Exit - PA	25 MILE Legend goes out						
			• 50 MILE	13	Change format to 50 mile scale. Only valid if 25, 100 or 200 mile scale currently selected. Exit - PA	50 MILE Legend goes out						
			100 MILE	14	Change format to 100 mile scale. Only valid if 25, 50 or 200 mile scale currently selected. Exit - PA	100 MILE Legend goes out						
			200 MILE	15	Change format to 200 mile scale. Only valid if 25, 50, or 100 mile scale currently selected. Exit - PA	200 MILE Legend goes out						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: MOBIZ INFO (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROC. LEG. RESP/STIM
RETRN FLTPL (cont'd)			* A/C CENTR	16	Change format to A/C centered Validates - "A/C DEPRS" Exit - PA	A/C CENTR Legend goes out						
			A/C DEPRS		Change format to A/C depressed Validates - "A/C CENTR" Exit - PA	A/C DEPRS Legend goes out						
			FLTPL	26	Add flight plan to alternate flight plan format. Validates - "FLTPL DELET" Exit - PA	FLTPL Legend goes out						
			* FLTPL DELET		Deletes flight plan from alternate flight plan format Validates - "FLTPL" Exit - PA	FLTPL DELET Legend goes out						
INFO AMPLF	30	Enable Cursor on MOBIZ INFO display "INFO AMPLF" to APP Area 1	FORCE STICK Enabled		Position cursor on display based on force stick inputs	NONE						
			DESIG	16	Provide amplifying information for hooked symbol when "DESIG" is selected Exit - PA	NONE						
RMFD	6	MOBIZ INFO formats displayed on RMFD RMFD - BV Exit - PA	RMFD Legend goes out									
* LMFD	9	MOBIZ INFO formats displayed on LMFD LMFD - BV Exit - PA	LMFD Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: ENG INFO (SCP FIXED) (1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM
ENG MONITR	1	Engine Monitor format displayed on current ENG INFO display. "ENG MONITR" to DFD Area 1 Exit - PA	MAIN ENG	3	Main Engine format to current ENG INFO display. "MAIN ENG" to DFD Area 2	Return to 2nd level Control						
			FUEL/ CONTR	6	Fuel/Control format to current ENG INFO display "FUEL CONTR" to DFD Area 2	Return to 2nd level Control						
			LUB	11	LUB format to current ENG INFO display "LUB" to DFD Area 2	Return to 2nd level Control						
			MECHL	14	Mechanical format to current ENG INFO display. "MECHL" to DFD Area 2	Return to 2nd level Control						
ENG START	6	Engine Start format displayed on current ENG INFO display "ENG START" to DFD Area 1	Return to 2nd level Control									
HMFD	4	ENG INFO displayed on HMFD LSAD - BV LMFD - V RSAD - V Exit - PA	HMFD Legend goes out									
LSAD	8	ENG INFO displayed on LSAD HMFD - V LMFD - V RSAD - V Exit - PA	LSAD Legend goes out									
LMFD	9	ENG INFO displayed on LMFD LSAD - BV HMFD - V RSAD - V Exit - PA	LMFD Legend goes out									
RSAD	10	ENG INFO displayed on RSAD LSAD - BV HMFD - V LMFD - V Exit - PA	RSAD Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: SYS INFO (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: System Status format, is displayed on HEAD. All other displays remain as they were.

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
LANDG GEAR	1	Landing Gear Sub-System format is displayed on Current SYS INFO display	TBD SEE NOTE					NOTE - Detailed Control functions will be developed for each monitored sub-system. HYD & ENG are shown as representative samples of further detail.				
ELEC	2	Electrical Sub-System format is displayed on current SYS INFO display	TBD SEE NOTE									
HYD	6	Hydraulics Sub-System Format, is displayed on current SYS INFO display "HYD" to SPD Area 1	CMBND	1	Combined Sub-System format is displayed on current SYS INFO display "CMBND" to SPD Area 2	Return to 2nd level Control						
			FLT	6	Flight Sub-System format is displayed on current SYS INFO display. "FLT" to SPD Area 2	Return to 2nd level Control						
			OUTBD SPLR	11	Outboard spoiler Sub-System format, , is displayed on current SYS INFO display. "OUTBD SPLR" to SPD Area 2	Return to 2nd level Control						
			BK-UP FLCTL	16	Back-up Flight Control Sub-System format is displayed on current SYS INFO display "BK-UP FLCTL" to SPD Area 2	Return to 2nd level Control						
PITCH	7	Pitch Sub-System format is displayed on current SYS INFO display	TBD SEE NOTE									
AUTO PILOT	11	Auto Pilot Sub-System format is displayed on current SYS INFO display	TBD SEE NOTE									
YAW	12	YAW Sub-System format is displayed on current SYS INFO display	TBD SEE NOTE									
DISPL	16	Display Sub-System format is displayed on current SYS INFO display	TBD SEE NOTE									
NAV	17	Navigation Sub-System format is displayed on current SYS INFO display.	TBD SEE NOTE									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: SYS INFO (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: System Status format, is displayed on RSAD. All other displays remain as they were

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

FUNC.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC.LEG. RESP/STIM
FUEL	21	Fuel Sub-System format is displayed on current SYS INFO display	TBD SEE NOTE									
ENG.	22	Engine Sub-System format is displayed on current SYS INFO display "ENG" to SFD Area 1	ENG MONTR	1	Engine Monitor format is displayed on LSAD "ENG MONTR" to SFD Area 2	MAIN ENG	3	Engine parameters are displayed on LSAD "MAIN ENG" to SFD Area 3	Return to 2nd level Control			
						FUEL CONTR	5	Fuel and Control parameters are displayed on LSAD "FUEL CONTR" to SFD Area 3	Return to 2nd level Control			
						LUB	41	LUB parameters are displayed on LSAD "LUB" to SFD Area 3	Return to 2nd level Control			
						MECHL	46	Mechanical parameters are displayed on LSAD "MECHL" to SFD Area 3	Return to 2nd level Control			
			ENG START	4	Engine Start format is displayed on LSAD "ENG START" to SFD Area 2	Return to 2nd level Control						
CDNS	26	CDNS Sub-System format is displayed on current SYS INFO display.	TBD SEE NOTE									
RMFD	6	SYS INFO displayed on RMFD RSAD - DV LSAD - V LMFD - V Exit - PA	RMFD Legend goes out									
LSAD	8	SYS INFO displayed on LSAD RSAD - DV RMFD - V LMFD - V Exit - PA	LSAD Legend goes out									
LMFD	9	SYS INFO displayed on LMFD RSAD - DV RMFD - V LSAD - V Exit - PA	LMFD Legend goes out									
• RSAD	10	SYS INFO displayed on RSAD RMFD - V LMFD - V LSAD - V Exit - PA	RSAD Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: CHECK LIST (ICP FIXED) (1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL)			(3RD LEVEL CONTROL)			(4TH LEVEL CONTROL)			(5TH LEVEL CONTROL)			
PMG.LOG. RESP/STIM	LOC	SYSTEM RESPONSE	PMG. LOG. RESP/STIM	LOC	SYSTEM RESPONSE	PMG.LOG. RESP/STIM	LOC	SYSTEM RESPONSE	PMG. LOG. RESP/STIM	LOC	SYSTEM RESPONSE	PMG.LOG. RESP/STIM
INTRL INSPN	1	Internal Inspection checklist displayed on current checklist display "INTRL INSPN" to SPD Area 1 Exit - PA	NONE									
DATA ENTRY	2	Data Entry checklist displayed on current checklist display "DATA ENTRY" to SPD Area 1 Exit - PA	RNWAY DSTCE	1	Cursor symbol displayed at "Runway Distance" on checklist "RNWAY DSTCE" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "RNWAY DSTCE" displayed on upper line of SPD data area. System checks validity of entered data and displays data on Data Entry checklist format.	Return to 3rd level Control			
			RNWAY HEADG	6	Cursor symbol displayed at "Runway Heading" on checklist "RNWAY HEADG" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "RNWAY HEADG" displayed on upper line of SPD data area. System checks validity of entered data and displays data on Data Entry checklist format	Return to 3rd level Control			
			TRUE WIND	11	Cursor symbol displayed at "True Wind" on checklist. "TRUE WIND to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "TRUE WIND" displayed on upper line of SPD data area. System checks validity of entered data and displays data on Data Entry checklist format	Return to 3rd level Control			
			SLOPE	16	Cursor symbol displayed at "SLOPE" on checklist "SLOPE" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "SLOPE" displayed on upper line of SPD data area. System checks validity of entered data and displays data on Data Entry checklist format.	Return to 3rd level Control			
			GROSS WIGHT	21	Cursor symbol displayed at "GROSS WIGHT" on checklist "GROSS WIGHT" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "GROSS WIGHT" displayed on upper line of SPD data area. System checks validity of entered data and displays data on Data Entry checklist format.	Return to 3rd level Control			
			RNWAY TEMP	26	Cursor symbol displayed at "RNWAY TEMP" on checklist "RNWAY TEMP" to SPD Area 2	INTEGER KEYSET ENABLED		Cueing message "RNWAY TEMP" displayed on upper line of SPD data area. System checks validity of entered data and displays data on Data Entry checklist format	Return to 3rd level Control			

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: CHECK LIST (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

— — — (2ND LEVEL CONTROL) — — — (3RD LEVEL CONTROL) — — — (4TH LEVEL CONTROL) — — — (5TH LEVEL CONTROL) — — —

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
ENG START	5	Engine start checklist displayed on current CHECKLIST display. "ENG START" to SPD Area] Exit - PA	ENG START Legend goes out									
POST START	7	Post start checklist displayed on current CHECKLIST display "POST START" to SPD Area] Exit - PA	POST START Legend goes out									
TAXI	11	Taxi checklist displayed on current CHECKLIST display "TAXI" to SPD Area] Exit - PA	TAXI Legend goes out									
CTO CKLST	16	Conventional Take off checklist displayed on current CHECKLIST display "CTO CKLST" to SPD Area] Exit - PA	CTO CKLST Legend goes out									
STO CKLST	17	Short Takeoff checklist displayed on current CHECKLIST display "STO CKLST" to SPD Area] Exit - PA	STO CKLST Legend goes out									
VTO CKLST	18	Vertical takeoff checklist displayed on current CHECKLIST display. "VTO CKLST" to SPD Area] Exit - PA	VTO CKLST Legend goes out									
PRLND DSCNT	1	Preland/Descent checklist displayed on current CHECKLIST display "PRLND DSCNT" to SPD Area] Exit - PA	PRLND DSCNT Legend goes out									
CL CKLST	16	Conventional Landing checklist displayed on current CHECKLIST display "CL CKLST" to SPD Area] Exit - PA	CL CKLST Legend goes out									

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: CHECK LIST (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PUSH.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH.LEG. RESP/STIM
SL CKLST	27	Short Landing checklist displayed on current CHECKLIST display. "SL CKLST" in SYD Area 1 Exit - PA	SL CKLST Legend goes out									
VL CKLST	28	Vertical Landing checklist displayed on current CHECK-LIST display "VL CKLST" in SYD Area 1 Exit - PA	VL CKLST Legend goes out									
MWFD	4	CHECKLIST formats displayed on MWFD RSAD - BV LWFD - V LSAD - V Exit - PA	MWFD Legend goes out									
LSAD	8	CHECKLIST formats displayed on LSAD RSAD - BV MWFD - V LWFD - V Exit - PA	LSAD Legend goes out									
LWFD	9	CHECKLIST formats displayed on LWFD RSAD - BV MWFD - V LSAD - V Exit - PA	LWFD Legend goes out									
RSAD	10	CHECKLIST formats displayed on RSAD MWFD - V LWFD - V LSAD - V Exit - PA	RSAD Legend goes out									
TEXT	13	Checklist displayed in "TEXT" format. This format can only be deselected by selection of "TEXT MONTR" or "MONTR". TEXT MONTR - BV Exit - PA	TEXT Legend goes out									

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TABLE B-1. PILOT CONTROL-ACTION/SYSTEM REFERENCE (Continued)

LEGEND: CHECK LIST (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
* TEXT MONTR	14	Checklist displayed in "TEXT MONTR" format. This format can only be deselected by selection of "TEXT" or "MONTR" Exit - PA	TEXT MONTR Legend goes out									
MONTR	15	Checklist displayed in "MONTR" format. This format can only be deselected by selection of "TEXT" of "TEXT MONTR" TEXT MONTR - BV Exit - PA	MONTR Legend goes out									
TOLER OUT	24	OUT-OF-TOLERANCE symbol (arrow) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	NO CHANGE									
TOLER IN	23	IN-TOLERANCE Symbol (Check-mark) displayed at far right of parameter format. Cursor symbol advances to next parameter. Exit - PA	No CHANGE									
* BACK PAGE	29	Checklist format returns (backpages) to Previously displayed set of data. This function only valid if: a) Checklist is more than 1 page (format) long b) "ADVAN PAGE" has been selected Exit - PA	No Change									
* ADVAN PAGE	30	Checklist format advances (Advance Page) to the next set of data. This function is only valid if the checklist is more than 1 page (format) long "BACK PAGE" - V Exit - PA	No Change									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: A/C SYS (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL)

(3RD LEVEL CONTROL)

(4TH LEVEL CONTROL)

(5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
INTER LIGHT	1	"INTER LIGHT" to SPD Area 1 Exit - PA	ON •	1	ON- Apply power to interior Lights. All other functions - V Exit - PA	ON Legend goes out						
			OFF		OFF- Remove power from interior Lights ON-BY All others - 1	Return to 2nd level Control						
			ICP 1	6	Force stick enabled- illumination level of ICP 1 set "ICP 1" to SPD Area 2 Exit - PA	ICP 1 Legend goes out						
			ICP 2	7	Force stick enabled- illumination level of ICP 2 set "ICP 2" to SPD Area 2 Exit - PA	ICP 2 Legend goes out						
			LEFT PANEL	11	Force stick enabled- illumination level of Left Panel set "LEFT PANEL" to SPD Area 2 Exit - PA	LEFT PANEL Legend goes out						
			CENTR PANEL	12	Force stick enabled- illumination level of Center Panel set "CENTR PANEL" to SPD Area 2 Exit - PA	CENTR PANEL Legend goes out						
			RIGHT PANEL	13	Force stick enabled- illumination level of Right Panel set. "RIGHT PANEL" to SPD Area 2 Exit - PA	RIGHT PANEL Legend goes out						
			INDIC LIGHT	16	Force stick enabled- illumination level of cockpit indicator lights set. "INDIC LIGHT" to SPD Area 2 Exit - PA	INDIC LIGHT Legend goes out						
			FAULT RESET	26	Command to SOSTEL Exit - PA	NO CHANGE						
			TRIP RESET	27	Command to SOSTEL Exit - PA	NO CHANGE						

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: A/C SYS (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
HUD	3	"HUD" to SPD Area 1 Exit - PA	ON *	1	ON- Apply power to HUD All other functions - Y Exit - PA	ON Legend goes out						
			OFF		OFF-Remove power form HUD ON-OFF All others - Y	Return to 2nd level Control						
			STNBY	3	Blank HUD display "STNBY" to SPD Area 3 Exit - PA	STNBY Legend goes out						
			SELF TEST	4	Perform HUD test. Display "PASS" or "FAIL" on HUD. "SELF TEST" to SPD Area 3 Exit - PA	SELF TEST Legend goes out						
			TEST PATRN	5	Display HUD test pattern "TEST PATRN" to SPD Area 3 Exit - PA	TEST PATRN Legend goes out						
			FAULT RESET	26	Command to BOSTEL Exit - PA	No Change						
			TRIP RESET	27	Command to BOSTEL Exit - PA	No Change						
HMFD	4	"HMFD" to SPD Area 1 Exit - PA	* ON	1	ON- Apply power to HMFD All other functions - Y Exit - PA	ON Legend goes out						
			OFF		OFF-Remove power from HMFD ON-OFF All others - Y	Return to 2nd level Control						
			STNBY	3	Blank HMFD display "STNBY" to SPD Area 3 Exit - PA	STNBY Legend goes out						
			SELF TEST	4	Perform HMFD test Display "PASS" or "FAIL" on HMFD "SELF TEST" to SPD Area 3 Exit - PA	SELF TEST Legend goes out						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: A/C SYS (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

FUNC.LEG. RESP/STIM	AC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	FUNC.LEG. RESP/STIM	AC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	FUNC.LEG. RESP/STIM
UFD (cont'd)			TEST PATRN	5	Display UFD test pattern "TEST PATRN" to SFD Area 1 Exit - FA	TEST PATRN Legend goes out						
			FAULT RESET	26	Command to POSTEL Exit - FA	No Change						
			TRIP RESET	27	Command to POSTEL Exit - FA	No Change						
HMD	5	"HMD" to SFD Area 1 Exit - FA	* ON	1	ON- Apply power to HMD All other functions - V Exit - FA	ON Legend goes out						
			OFF		OFF-Remove power from HMD ON-OFF All others - I	Return to 2nd level Control						
			STBY	3	Blank HMD test. "STBY" to SFD Area 1 Exit - FA	STBY Legend goes out						
			SELF TEST	4	Perform HMD test Display "PASS" or "FAIL" on HMD "SELF TEST" to SFD Area 1 Exit - FA	SELF TEST Legend goes out						
			TEST PATRN	5	Display HMD test pattern "TEST PATRN" to SFD Area 1 Exit - FA	TEST PATRN Legend goes out						
			FAULT RESET	26	Command to POSTEL Exit - FA	No Change						
			TRIP RESET	27	Command to POSTEL Exit - FA	No Change						
ICP 1	6	"ICP 1" to SFD Area 1 Exit - FA	* ON	1	ON- Apply power to ICP 1 All other functions - V Exit - FA	ON Legend goes out						
			OFF		OFF-Remove power from ICP 1 ON-OFF All others - I	Return to 2nd level Control						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: A/C SYS (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM
ICP 1 (cont'd)			TEST	4	Perform ICP Test. Display "PASS" or "FAIL" on scratch pad display "TEST to SPD Area 2 Exit - PA	TEST Legend goes out						
			FAULT RESET	26	Command to SOSTEL Exit - PA	No Change						
			TRIP RESET	27	Command to SOSTEL Exit - PA	NO CHANGE						
ICP	7	"ICP 2" to SPD Area 1 Exit - PA	● ON	1	ON-Apply power to ICP 2 All other functions - Y Exit - PA	ON Legend goes out						
			OFF		OFF-Remove power from ICP 2 ON-BY All others - 1	Return to 2nd level Control						
			TEST	4	Perform ICP Test. Display "PASS" or "FAIL" on scratch pad display "TEST" to SPD Area 2 Exit - PA	TEST Legend goes out						
			FAULT RESET	26	Command to SOSTEL Exit - PA	No Change						
			TRIP RESET	27	Command to SOSTEL Exit - PA	NO CHANGE						
LSAD	8	"LSAD" to SPD Area 1 Exit - PA	● ON	1	ON- Apply power to LSAD All other functions - Y Exit - PA	ON Legend goes out						
			OFF		OFF-Remove power from LSAD ON-BY All others - 1	Return to 2nd level Control						
			STNBY	3	Blank LSAD display "STNBY" to SPD Area 2 Exit - PA	STNBY Legend goes out						
			SELF TEST	4	Perform LSAD test. Display "PASS" or "FAIL" on LSAD "SELF TEST" to SPD Area 2 Exit - PA	SELF TEST Legend goes out						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: A/C SYS (ICP FIXED) (1ST LEVEL CONTROL) — SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE *	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM
LSAD (cont'd)			TEST PATRN	5	Display LSAD test pattern "TEST PATRN" to SPD Area 3 Exit - PA	TEST PATRN Legend goes out						
			FAULT RESET	26	Command to BOSTEL Exit - PA	No Change						
			TRIP RESET	27	Command to BOSTEL Exit - PA	No Change						
LNFD	9	"LNFD" to SPD Area 1 Exit - PA	* ON	1	ON - Apply power to LNFD All other functions - Y Exit - PA	ON Legend goes out						
			OFF		OFF - Remove power from LNFD ON - BV All others - X	Return to 2nd level Control						
			STNBY	3	Blank LNFD display "STNBY" to SPD Area 2 Exit - PA	STNBY Legend goes out						
			SELF TEST	4	Perform LNFD test Display "PASS" or "FAIL" on LSAD "SELF TEST" to SPD Area 3 Exit - PA	SELF TEST Legend goes out						
			TEST PATRN	5	Display LSAD test pattern "TEST PATRN" to SPD Area 3 Exit - PA	TEST PATRN Legend goes out						
			FAULT RESET	26	Command to BOSTEL Exit - PA	No Change						
			TRIP RESET	27	Command to BOSTEL Exit - PA	No Change						
RSAD	10	"RSAD" to SPD Area 1 Exit - PA	* ON	1	ON - Apply power to RSAD All other functions - Y Exit - PA	ON Legend goes out						
			OFF		OFF - Remove power from RSAD ON - BV All others - X	Return to 2nd level Control						

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: A/C SYS (ICP FIELD) (1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL) (3RD LEVEL CONTROL) (4TH LEVEL CONTROL) (5TH LEVEL CONTROL)

PUSH. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PUSH. LEG. RESP/STIM
HEAD (cont'd)			STBY	3	Blank HEAD display "STBY" to SPD Area 3 Unit - PA	STBY Legend goes out						
			SELF TEST	6	Perform HEAD Test Display "PASS" or "FAIL" on HEAD "SELF TEST" to SPD Area 3 Unit - PA	SELF TEST Legend goes out						
			TEST PATRN	5	Display HEAD test pattern "TEST PATRN" to SPD Area 3 Unit - PA	TEST PATRN Legend goes out						
			FAULT RESET	34	Command to SOSTEL Unit - PA	No Change						
			TRIP RESET	32	Command to SOSTEL Unit - PA	No Change						
MLAIDS	11	"MLAIDS" to SPD Area 1 Unit - PA	FAULT HSTRY	1	"FAULT HSTRY" to SPD Area 2	PRIOR 1	1	Display Priority 1 Failure	Return to 2nd Level Control			
						PRIOR 2	6	Display Priority 2 Failure	Return to 2nd Level Control			
						HSTRY	11	Display History	Return to 2nd Level Control			
			• FLT HSTRY (Valid only on ground in POST FLT MODE)	2	"FLT HSTRY" to SPD Area 2	INIT	1	Initialize Fault History	Return to 2nd Level Control			
						DISPL	7	Display Fault History	Return to 2nd Level Control			
			TEST	6	Display MLAIDS STATUS "TEST" to SPD Area 3 Unit - PA	TEST Legend goes out						

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: A/C 319 (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: NONE

(2ND LEVEL CONTROL)			(3RD LEVEL CONTROL)			(4TH LEVEL CONTROL)			(5TH LEVEL CONTROL)			
FUNC.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	FUNC.LEG. RESP/STIM
MLAID (cont'd)			RCORD	6	"RCORD" to SPD Area 3	SNAP	1	Record 10 seconds of data	Return to 2nd level Control			
						CONTU	2	Record Continuous	Return to 2nd level Control			
						STOP	3	Stop Recorder	Return to 2nd level Control			
			FIR JETSN	16	Jettison FIR	Return to 2nd level Control						
			FAULT RESET	26	Command to SOSTEL. Exit - FA	No Change						
			TRIP RESET	27	Command to SOSTEL. Exit - FA	No Change						
NPS	15	"NPS" to SPD Area 1 Exit - FA	ON	1	ON- Apply power to NPS All other functions - V Exit - FA	ON Legend goes out						
			OFF		OFF- Remove power from NPS ON- SV All others - I	Return to 2nd level Control						
			BIAS STORE	3	Display reticle only on HUD- Indicate Pilot to be held at 0° AZ, 0° Roll, -0.07° EL. Enter (By means of TAE Switch-external to AIDS) Send TAE Signal to NPS. Switch NPS to Normal Mode. Display Bias Complete.	BIAS STORE Legend goes out Return to 2nd level Control						
			FAULT RESET	26	Command to SOSTEL. Exit - FA	No Change						
			TRIP RESET	27	Command to SOSTEL. Exit - FA	No Change						

TABLE B-1. PILOT CONTROL/FUNCTION/SYSTEM REFERENCE (Continued)

LEGEND: MCP (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: ICP ASSUMES MCP functions

(2ND LEVEL CONTROL) — (3RD LEVEL CONTROL) — (4TH LEVEL CONTROL) — (5TH LEVEL CONTROL)

PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LEG. RESP/STIM	LOC	SYSTEM RESPONSE	PROG.LEG. RESP/STIM
PRE FLT	1	"PRE FLT" to SPD Area 1 System to Pre-Flight mode Exit - PA	PRE FLT Legend goes out									
TAXI	2	"TAXI" to SPD Area 1 System to Taxi mode Exit - PA	TAXI Legend									
CTO	3	"CTO" to SPD Area 1 System to CTO mode Exit - PA	CTO Legend goes out									
STO	4	"STO" to SPD Area 1 System to STO mode Exit - PA	STO Legend goes out									
VTO	5	"VTO" to SPD Area 1 System to VTO mode Exit - PA	VTO Legend goes out									
CLIMB	6	"CLIMB" to SPD Area 1 System to CLIMB mode Exit - PA	CLIMB Legend goes out									
SERCH	7	"SERCH" to SPD Area 1 System to SERCH mode Exit - PA	SERCH Legend goes out									
A/G	8	"A/G" to SPD Area 1 System to A/G mode Exit - PA	A/G Legend goes out									
CL	9	"CL" to SPD Area 1 System to CL mode Exit - PA	CL Legend goes out									
SL	10	"SL" to SPD Area 1 System to SL mode Exit - PA	SL Legend goes out									
VL	11	"VL" to SPD Area 1 System to VL mode Exit - PA	VL Legend goes out									
POST FLT	12	"POST FLT" to SPD Area 1 System to POST FLT mode Exit - PA	POST FLT Legend goes out									

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TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: EMERG (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: All transmitters are automatically set to the "Emergency" frequencies. Currently selected other (ICP FIXED) functions and its indenture levels remain.

(2ND LEVEL CONTROL) (3RD LEVEL CONTROL) (4TH LEVEL CONTROL) (5TH LEVEL CONTROL)

PROC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROC. LEG. RESP/STIM	AC	SYSTEM RESPONSE	PROC. LEG. RESP/STIM

TABLE B-1. PILOT CONTROL/ACTION/SYSTEM REFERENCE (Continued)

LEGEND: RETURN (ICP FIXED)
(1ST LEVEL CONTROL)

SYSTEM RESPONSE: Returns system to the next higher indenture level. This function can be selected in addition to the current (ICP FIXED) selected function

(2ND LEVEL CONTROL)

(3RD LEVEL CONTROL)

(4TH LEVEL CONTROL)

(5TH LEVEL CONTROL)

PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM	LOC	SYSTEM RESPONSE	PROG. LOC. RESP/STIM

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TABLE B-2. (TACCO/SENSO) CONTROL ACTION/SYSTEM REFERENCE

FIRST LEVEL CONTROL				SECOND LEVEL CONTROL		THIRD LEVEL CONTROL			FOURTH LEVEL CONTROL		FIFTH LEVEL CONTROL	
LEGEND	ACP	ACP PIR	SYSTEM RESPONSE	PROG LEG. RESPONSE/ STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE/ STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE/ STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE STIMULUS
DATA LINK		X	None	LINK CONT	None	GRID LOCK	None	Return to 1st level				
						NET ACTIVE	None	"				
						LINK PRNTR	"	"				
						DATA DROP	"	"				
				LINK OPER	None	DATA SLNCE	"	"				
						ACK ORDER	"	"				
						ASSGN REPORT	"	"				
ACOUSTICS SENSORS		X	None	PSU AUX CONT	None	MFD HOLD	"	"				
						RF CONT	"	"				
						XLATE	"	"				
						HOLD RF	"	"				
						RLSE RF	"	"				
				PING CONT	None	SONO A	"	"				
						SONO B	"	"				
						SONO L	"	"				
						SONO D	"	"				
						ASSIGN RF	"	"				
						PING INTVL	"	"				
						ALTN	"	"				
				ANCL RCDR	None	DUMP	"	"				
						PLAY	"	"				
						RECORD	"	"				
						STOP	"	"				
						ASSIGN	"	"				
						RELEASE	"	"				

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TABLE B-2. (TACCO/SENSO) CONTROL ACTION/SYSTEM REFERENCE (CONTINUED)

FIRST LEVEL CONTROL				SECOND LEVEL CONTROL		THIRD LEVEL CONTROL			FOURTH LEVEL CONTROL		FIFTH LEVEL CONTROL	
LEGEND	MCP	SCP FIX	SYSTEM RESPONSE	PROG LEG. RESPONSE/ STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE/ STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE/ STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE STIMULUS
ACOUSTIC SENSORS				DIFAR	None	ADV SLEWE	None	Return to 1st level				
Continued						MEDIAS	″					
						ALIS B SCAN	″	″				
						D ANLY	″	″				
						CURSOR BRG	″	″				
						TERM TRK	″	″				
NAVIGATION		X	None	GEO NAV	None	READ L/L	″	″				
						INSERT L/L	″	″				
						GRID COOR	″	″				
						CYS POSTN	″	″				
						GEO CORR	″	″				
						MARK TIME	″	″				
				TAC NAV	None	INIT TAC	″	″				
						A/C CORR	″	″				
						SONO CORR	″	″				
						INSRT	″	″				
						A/C TRK	″	″				
						NOD BIAS	″	″				
						INIT	″	″				
ARMAMENT		X	None	SEARCH STORES	None	LOFAR	″	″				
						DIFAR	″	″				
						CASS	″	″				
						DICASS	″	″				
						SMOKE	″	″				
						STR LOAD	″	″				
						ST	″	″				

TABLE B-2. (TACCO/SENSO) CONTROL ACTION/SYSTEM REFERENCE (CONTINUED)

FIRST LEVEL CONTROL				SECOND LEVEL CONTROL		THIRD LEVEL CONTROL		FOURTH LEVEL CONTROL		FIFTH LEVEL CONTROL		
LEGEND	MCP	ICP FIX	SYSTEM RESPONSE	PROG LEG. RESPONSE/STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE/STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE/STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE STIMULUS	SYSTEM RESPONSE	PROG LEG. RESPONSE STIMULUS
ARMAMENT		X	None	SEARCH STORES		RO	None	Return to 1st level				
				KILL STORES		TORP	"	"				
						BOMB	"	"				
						MINE	"	"				
						PRAC	"	"				
						CLSTR	"	"				
						SUS	"	"				
				CONT		Return to 1st level						
NON ACOUSTIC SENSORS		X	None	FLIR	None	"						
				RADAR	"	"						
				MAD	"	"						
				IFF	"	"						
DISPLAY		X	None	TACCO	"	"						
				SENSO	"	"						
				CONT	"	"						
FR-C		X	None	TAC AIDS	"	"						
				TAC PLOT	"	"						
				REINIT	"	"						

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